BANGLADESH

Disaster resilient low cost houses

Capitalization of methods, activities and results

2007 - 2018

CRAterre Éditions

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Disaster resilient low cost houses

Capitalization of methods, activities and results

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We would like to sincerely thank those who took part in the activities presented in this publication, as well as those who contributed to the capitalization of experiences and the development of this document.

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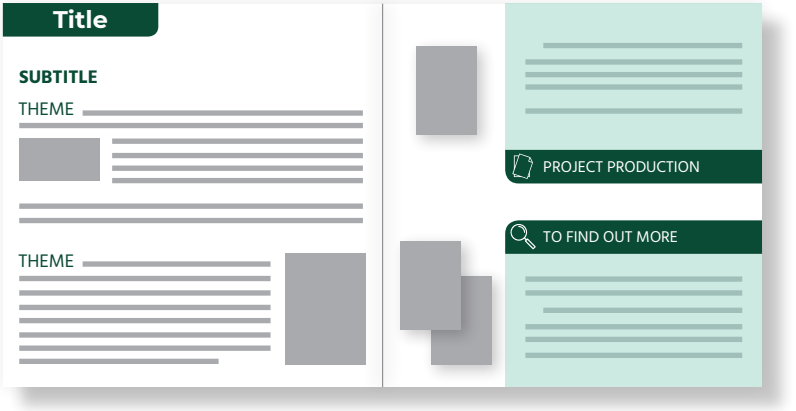
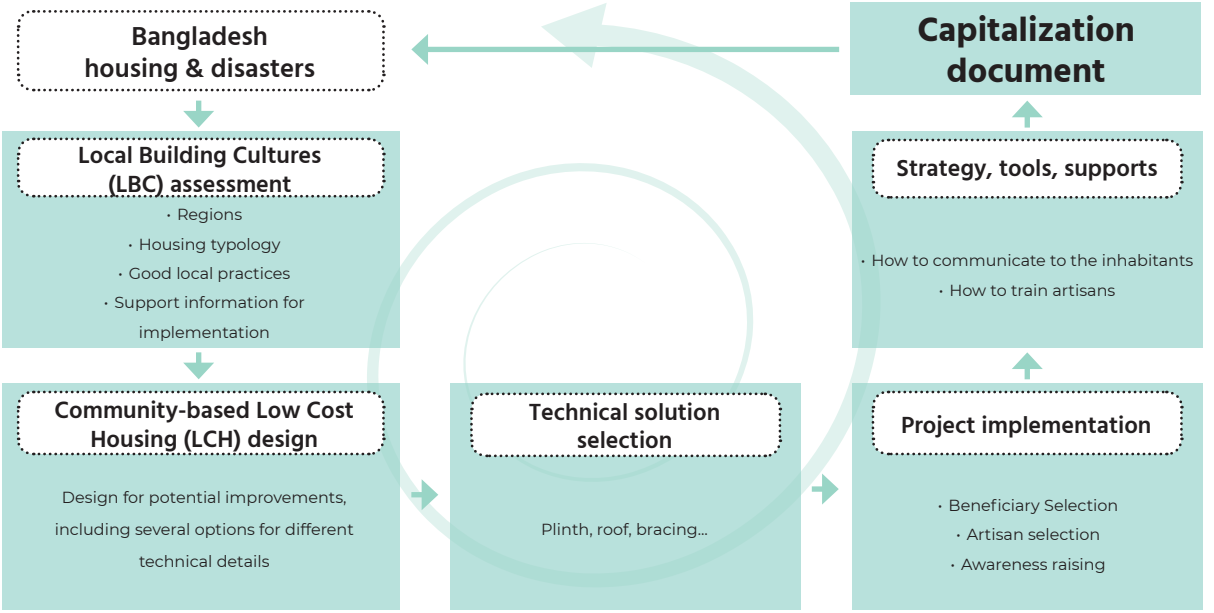
Chapter content

This document aims to share methods and tools developed during 12 years in Bangladesh on the theme of improving the habitat response in areas exposed to natural hazards.
Readers will find some references to documents developed outside the activities carried out by the partners of this project.
The authors are aware that they may have omitted some important references and will be happy to include them in future versions.



Capitalization concept


Bangladesh housing & disasters
Local Building Cultures (LBC) assessment
· Regions
· Housing typology
· Good local practices
· Support information for implementation
Community-based Low Cost Housing (LCH) design
Design for potential improvements, including several options for different technical details
Technical solution selection
Plinth, roof, bracing...
Project implementation
· Beneficiary Selection
· Artisan selection
· Awareness raising
Strategy, tools, supports
· How to communicate to the inhabitants
· How to train artisans
Capitalization document

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CARITAS BANGLADESH

Bangladesh is known as one of the most disaster-prone countries in the world. Floods, cyclones, tidal surge, landslides, tornadoes, bank erosion, drought and earthquakes are very common. Over 65% of households live in low-cost housing (LCH) that is structurally weak. Damage and loss of these houses during natural disasters are very common.

The right to housing has always been recognized as one of the fundamental rights of every human being. As a human development organisation and since 1970, Caritas Bangladesh (CB) has integrated shelter construction (LCH) into its postdisaster response programmes.

An external evaluation of CB's LCH projects, conducted in 2008 by Secours Catholique - Caritas France (SC - CF), identified that a more contextual response could better meet the needs and expectations of local populations. In response to this finding and building on lessons learned between 1970 and 2007, a project entitled "Low-cost Pilot Houses for Families in Disaster-prone Regions of Bangladesh" was implemented between 2010 and 2018. It took place in three phases.

The project was implemented with financial support from Secours Catholique - Caritas France and CARIux (Caritas Luxembourg) (for the second phase) and technical support from CRAterre (International centre for earthen architecture) and the Bangladesh University of Engineering and Technology (BUET). CB integrated the project process and lessons learned into its disaster risk reduction and emergency response projects and disseminated them at national and international level.

CB advocates and motivates at local, national and global levels for the integration of LCH postdisaster project development processes by disseminating its learning, good practices, tools and methods and the information, education and communication materials developed throughout the project.

BUET

Natural disasters -floods, cyclones, landslides, bank erosion and earthquakes- are the main obstacles to sustainable development in Bangladesh. In recent years, they have increased the burden on the most disadvantaged populations, jeopardizing the economic growth of the country as a whole. Although it is a small country, its culture, types of disasters and availability of building materials are diverse, and housing practices in different regions also vary considerably. A large number of rural houses are regularly damaged by disasters, causing economic losses and suffering to the population. The repeated removal of building materials, made necessary by the ever-changing destruction, also leads to environmental deterioration, as they are largely obtained locally from surrounding resources. Past experiences on disaster response have highlighted the need for contextual approaches to develop disaster-resilient rural housing.

Based on lessons learned from disaster responses after Cyclones Sidr in 2007 and Alia in 2009, Caritas Bangladesh took an initiative jointly with BUET and CRAterre involving inhabitants, to develop the design of disaster resilient houses. A project was carried out in eight different geographical regions of Bangladesh, in three phases and over a period of twelve years.

As part of this project, BUET studied local practices and the availability of local materials. Three-stage community meetings involving residents, local officials and artisans were organized to gather their views, demands and experiences. The properties of the local building materials were determined by laboratory tests. The technical solutions proposed and developed take into account the technical and financial capacities of the local populations as well as the cultural, social and environmental impacts. The designs were validated based on FEM (Finite element method) analyses. The BUET team also supervised the construction of the prototypes produced and monitored their performance over the years.

CRAterre

The "International centre for earthen architecture" mandate and objectives are "to encourage local authorities to take care of urban planning, to participate in the improvement of the living conditions of the most disadvantaged populations and to assist in the production and control by the user of his own living environment".

CRAterre and Secours Catholique - Caritas France have been working jointly since 2006 on issues related to housing in areas exposed to natural hazards.

Following Cyclones Sidr (2007) and Alia (2009), SC-CF responded positively to the request made by Caritas Bangladesh for CRAterre and BUET to support it in the processes to be put in place in terms of Habitat at Risk response to natural hazards.

The role of CRAterre has been to share with CB its experience in terms of integrated approach, support for self-recovering and understanding of the intelligences of local building cultures. Beyond postdisaster reconstruction, the objective of CRAterre has been to help local stakeholders to make informed choices in their reconstruction dynamics by aiming to create sustainable conditions for better prevention and risk preparedness.

This publication capitalizes on the experiences gained from this collaboration and aims to share them with individuals and institutions wishing to integrate these approaches into their disaster prevention and reconstruction programmes.

CARITAS FRANCE

Secours Catholique - Caritas France, with Craterre, has been supporting Caritas Bangladesh for more than 10 years to improve the habitat of the most vulnerable populations.

Bangladesh is one of the most disaster-prone countries in the world. It is therefore essential to work on disaster risk reduction to minimize the impact of hazards on the country's most vulnerable populations. The work and collaboration over the past 10 years between several partners now enables some of the poorest people in Bangladesh to have access to decent and cheap housing, which are much more adapted to climate risks.

This guide aims to disseminate the knowledge gained to as many actors as possible working in the field of disasters so that they can draw on the lessons learned in their own projects.

CARITAS LUXEMBOURG

In 2011, Caritas Luxembourg (CarLux) joined the project implemented by Caritas Bangladesh - supported by CRAterre expertise and initiated thanks to the funds from Secours Catholique, with the aim of reflecting on the challenges of postdisaster reconstruction based on a fine knowledge of local building cultures. CarLux supported the development of the methods and tools that made it possible to carry out the work accomplished.

Over the past few years, CarLux have shared, learned and grown with the project, which has enabled it to subsequently support postdisaster reconstruction in the Philippines and Nepal, using an approach that builds on local knowledge and skills, promotes capacity building in affected communities and supports, where possible, the development of local economies.

Over the years of collaboration on this project, the knowledge and capacities of all actors have improved thanks to fruitful exchanges between local and international partners, field actors and researchers.

Looking at the results of the entire process put in place, it seemed important to us that lessons learned be shared.

We hope that this document will help others implement these best practices in the future.

Dinajpur

GLOBAL FRAMEWORK

BACKGROUND

Global warming and the degradation of our environment are causing an increase in natural disasters around the world.

This is amplified by the fact that, for social and economic reasons, more and more people are forced to live in exposed areas, increasing, sometimes consciously, their vulnerability to hazards.

According to the United Nations (UN), 60 million people have been affected annually by these phenomena for the past 20 years.

Poor people living in low-income countries are often the first victims, although in Bangladesh and other countries, wealthier populations also remain at high risk. During disasters, the built environment is a sector that is heavily impacted, and for 80 per cent of disaster-affected households, the postdisaster recovery and reconstruction phase takes place with little or no support from local institutions or the international community.

Considering that the means for postdisaster reconstruction aid are limited, the question is: how to develop strategies to reach not only the 20% of assisted households but also the remaining 80% in a sustainable and preventive way?

HYPOTHESIS

The response provided by national and international organisations must naturally fit into the formal framework governing the sector, even if it is not perfectly adapted to the self-construction practices prevailing at the levels of the multiple territories of intervention: access to resources, costs, skills, legislative framework, etc.

However, as illustrated in this document, an approach that emphasizes support for self-reconstruction allows to foresee an impact on a larger scale and over a longer period of time. Trusting in the technical, social and economic response capacities of populations that have been exposed to disasters for centuries contributes to place the inhabitants at the heart of the process and engaging them in their own development.

It is therefore necessary to be able to identify and understand what people are doing on their own in order to promote improvements while perpetuating endogenous capacities for adaptation and evolution.

1 Parrack, et al. (2014), Getting the Message Across for Safer Self-Recovery in Post-Disaster Shelter, Open House International, p. 39

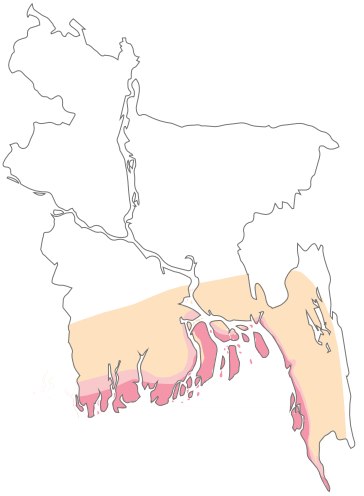
The aim is to strengthen each individual's ability to make their own informed choices, building on local strengths and dynamics that will be reinforced where necessary.

It is from this observation that a number of humanitarian organisations have joined forces to propose alternative approaches and project methodologies that are more contextual and adapted to the territories concerned and that aim to:

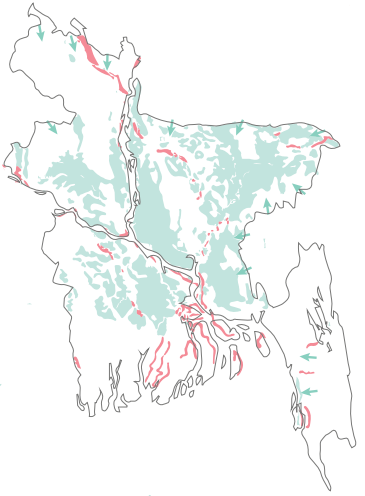
- Understand local processes of recovery from disasters
- Leverage local knowledge and expertise to propose technical modalities and solutions that significantly improve the safety and resilience of people in the contexts in which they live.
- Enrich local practices with new knowledge, while ensuring that their costs and technicalities remain accessible to the populations' capacities, while remaining respectful of their lifestyles.
- Put in place processes that allow for active community participation at all stages of the project to ensure the sustainability of the processes undertaken.

Earth and fibre for cob walls production

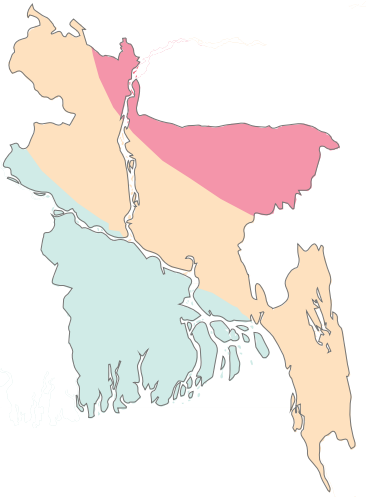
INTRODUCTION TO BANGLADESH



CYCLONE AFFECTED AREAS



FLOOD AFFECTED AREAS



SEISMIC AREAS

Bangladesh is a large country in South Asia with a population of 165 million people, a quarter of whom live below the poverty line.

Because of its geography, it is one of the most disaster-prone countries in the world. Floods, cyclones, tidal surges, landslides, tornadoes, bank erosion, drought and earthquakes are common.

In this particularly exposed context, local populations have been able to develop behaviour, construction techniques and architectural devices that meet their habitat needs while reducing their vulnerability to natural hazards.

These coping strategies are very diverse, sometimes even within the same village.

In order to help the people of Bangladesh to be better prepared for disasters, a programme, which took place in several stages between 2007 and 2020, was set up by Caritas Bangladesh, BUET and CRAterre, with the support of Secours

Catholique - Caritas France, Caritas Luxembourg and a large number of other local and international partners.

Beyond a local response to identified needs, the aim was to make available to the national and international community methods, strategies and technical solutions to enhance and make best use of existing local disaster preparedness practices. This document traces the main lessons learned from this experience while providing the reader with the main elements of the method and the technical solutions developed.

Extraction and preparation of earth for construction

Mymensingh

OVERALL APPROACH TAKEN

COMPREHENSIVE SOCIAL INCLUSION SUPPORTED BY THE PARTICIPATORY APPROACH

Experience shows that the success of a project is often the result of the pooling of local knowledge with that made available by external actors. Each must learn from the other, with the greatest respect of all parties. It is essential that every decision, including those relating to the habitat models proposed to the population, is made with the participation of the local community, this including validation and/or proposals for improvement and development.

The approach, while focusing on the most underprivileged, has actively involved all sections of the population, also taking into account the risks that more affluent sections of society may incur, in connection with the technical and architectural choices they favour.

Involving all segments of the population ensures greater participation and ownership by the entire community. This facilitates social cohesion and avoids stigmatisation. It also enhances the dignity of each individual by giving everyone a vision of possible positive developments from the technical proposals developed.

This logic has been favoured at all stages of the project, including the definition of the solutions to be promoted, the selection of beneficiaries, the choice of strategies for strengthening local skills and disseminating knowledge, etc.

Community meeting, Mymensingh

LOCAL BUILDING CULTURES

Local building cultures are the immaterial dimension of a building or, more broadly, of a human settlement built in interaction with its environment in order to settle, work, move around, recreate, etc. It includes elements related to the different phases of a building's life cycle, which cover sociological, economic, environmental and of course cultural aspects, including consideration of issues of symbolism and representation.

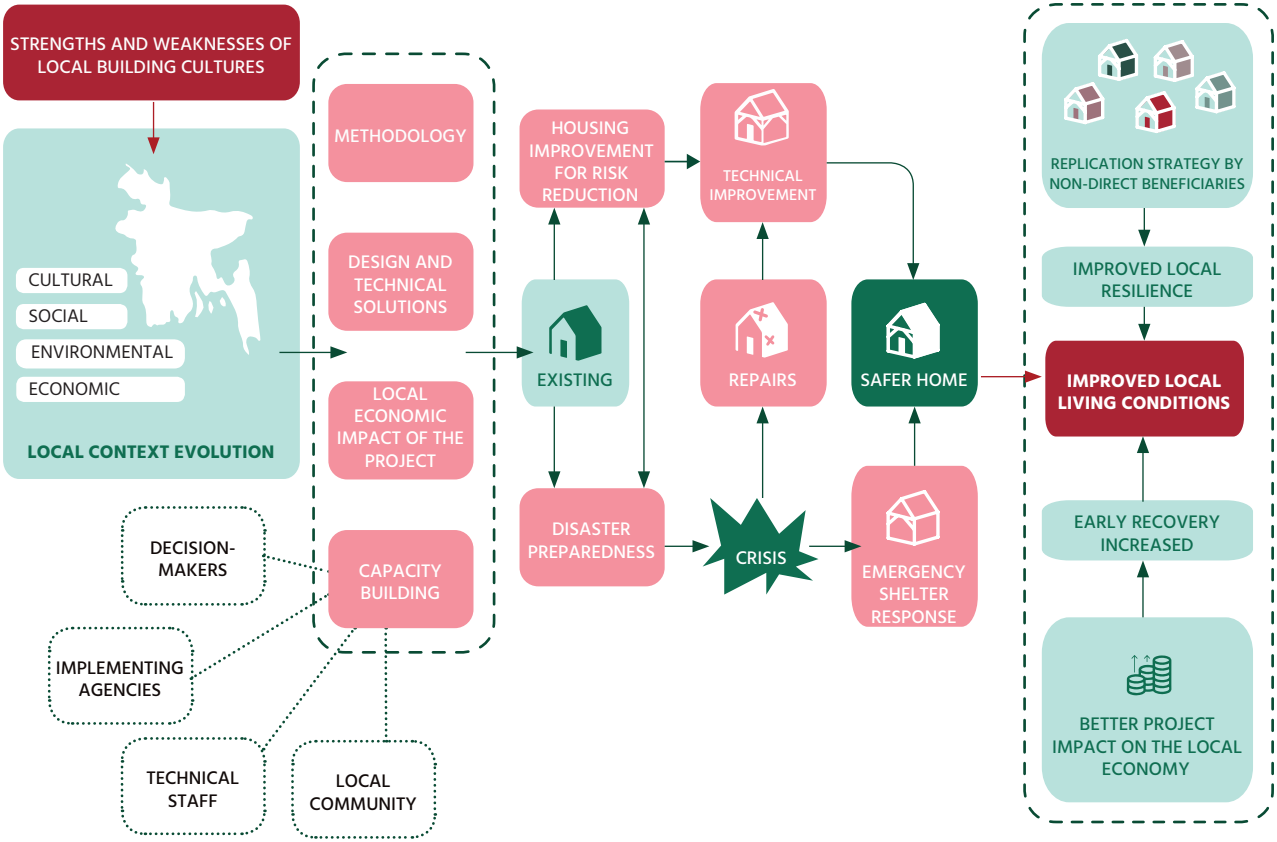
They reflect a collective intelligence in a given territory and context. They are the result of the resources available, the means at hand, the knowledge and know-how developed, cultural influences and lifestyles.

They are particularly readable in contexts of exposure to natural hazards, as they contribute to the resilience of populations.

Taking into account local building cultures is extremely valuable when it comes to improving the resilience of communities.

The identification, understanding, recognition and, where appropriate, improvement and strengthening of these local practices often leads to knowledge that is very useful for the definition of relevant disaster risk reduction and reconstruction programmes.

CONTEXTUAL PROCESS: LINKING EMERGENCY, REHABILITATION AND PREVENTION



PROCESS VERSUS PRODUCT

Support for affected communities must go beyond simply producing houses that will benefit only a few people in a village.

Initiating a process of identifying and promoting local knowledge and know-how that can be adopted by all local populations, while respecting the means and capacities available to them, allows for a wider and more significant impact of the projects initiated.

The diagnosis of the existing situation allows to analyse, understand and then take fully into account the strengths and weaknesses of the existing building practices. The aim is to highlight existing good practices, to validate them scientifically if necessary, and to propose solutions to overcome the weaknesses identified.

This approach does not necessarily favour the production of a habitat that is more resistant than the existing one. Sometimes, demountable habitat is more relevant than resistant one. In the case of the habitat of populations living on riverbanks, which are subject to rapid collapse, a technical solution based on resistance would be meaningless, as the building would be lost during the collapse. While a quickly dismantled, lightweight and transportable solution allows families to save their property and relocate quickly. This is what a careful analysis of the local contexts has identified in the Dinajpur region.

As part of the project, a range of safe and affordable options was developed based on existing situations, thus strengthening local know-how.

Demountable house, Dinajpur

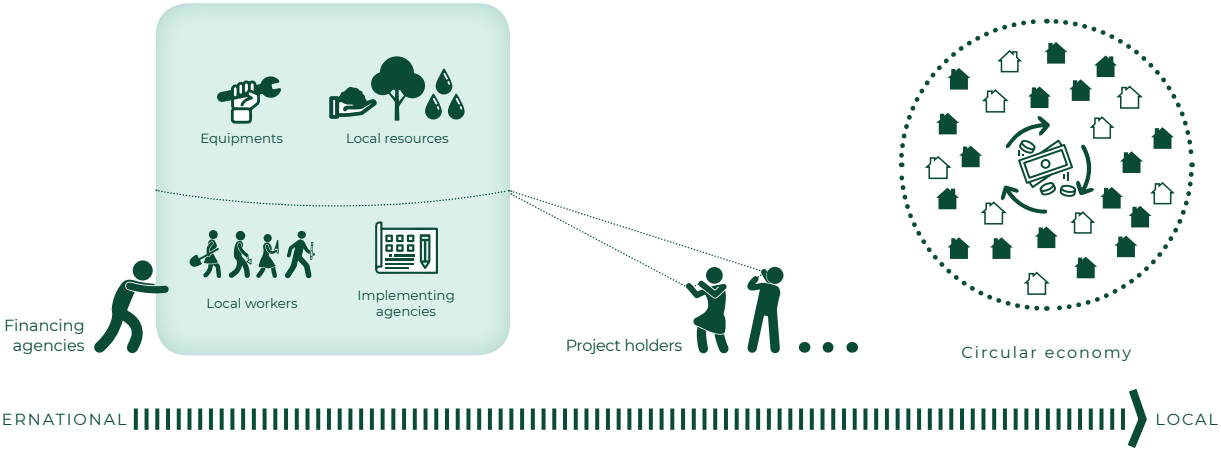
CONTRIBUTION BEYOND SHELTER PRODUCTION

The project must benefit the local population through the provision of solutions to help them have a roof over their heads, but also by ensuring that the money allocated for this purpose benefits these populations as a priority. The project must also ensure that the knowledge disseminated during the processes set up be useful to the community in the management of its self-recovery and development.

It is therefore not only a question of providing shelter for people in crucial need, but also of ensuring that the maximum amount of money spent on relocating people can feed local economies and build up local skills in a sustainable and useful way.

By focusing on this (human and material resources), the funds invested in postdisaster reconstruction contribute to the eradication of poverty, one of the main causes of the vulnerability of populations.

Tile production, Khulna



Impact on poverty reduction

PROJECT OBJECTIVES AND STRATEGIES

OVERALL TARGET

Building resilience through existing resources, knowledge and know-how: "making the most of locally available resources, practices and adaptive capacities."

In order to achieve the project objective, several targets were set:

- Value good local building practices
- Propose technical improvements for the production of a new habitat more adapted to local risks.
- Propose approaches to repair and improve existing habitat after it has been impacted by a hazard.
- Propose improvements to existing buildings to prevent risks related to future hazards.
- Train and sensitize all communities and other stakeholders in the habitat sector in at-risk areas to the practices promoted by the project.

Cob walls, Porsha

SPECIFIC OBJECTIVES:

SO1: The response to the needs of affected communities must go beyond the construction of a few houses benefiting only a limited number of people in a village.

It is necessary to engage a development process. Promoting in a comprehensive and inclusive manner the knowledge and know-how that exists or can be adopted by all local populations, while respecting the means and capacities available to them.

Strategy 1.1: Adopt an iterative process that allows the response to evolve as demand changes.
The methodology of the project was based on an iterative participatory approach integrating a set of complementary activities. This flexible process has the advantage of facilitating the adjustment of the initial choices in terms of design, construction, training, awareness, dissemination, etc.

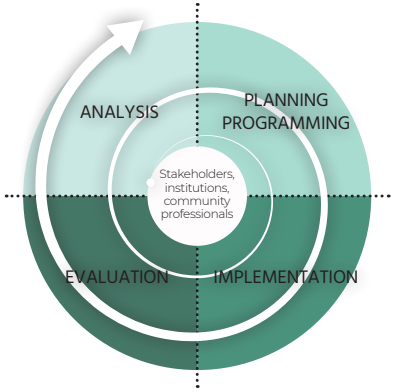
Strategy 1.2: Base the response on a detailed diagnosis of each territory where an intervention is carried out.
This diagnosis focuses on the human settlements sector. It provides a better understanding of the existing situation, the impact of «natural» hazards on houses and the local strategies developed to deal with them. It helps to identify the network of actors involved in the sector, (their roles and associated knowledge) and to understand the existing ecosystem in terms of housing production (administrative and legal environment, values, issues, construction techniques and potential resources).

It identifies existing vulnerabilities in this field, but also existing strengths and assets on which the response can usefully build.

It is an ongoing process over the duration of the project and beyond. It starts during the reflection on the project to be carried out and continues in order to refine the strategies and activities previously defined.

Strategy 1.3: Develop outreach strategies for the entire population.
Specific information and awareness-raising actions for local populations have been planned, budgeted and implemented. This has made it possible to concentrate part of the effort on actions that are less visible than the construction of demonstration buildings, but which ensure that populations not directly benefiting from the project have access to information and know how to make informed choices in their future investments.

Strategy 1.4: Design basic responses that take into account future changes in habitat.
This consisted in building responses on the basis of the resources and means existing at a given time (project capacities, capacities of the target groups) while ensuring that the proposed solutions could evolve in size or quality, to allow easy appropriation by the beneficiaries.



Iterative project approach

Working with local fibres, Khulna

Wooden braces and katla in Barisal. Project of DFID and BRAC University

SO2: The proposed solutions must be dignified and sustainable.

Multiple factors were taken into account: compliance with national and international standards, social acceptance, respect for existing cultural and environmental particularities, technical and economic adequacy of the proposals (construction, maintenance, future extensions) with the capacity and availability of local human and natural resources.

Strategy 2.1: Adequately assess the strengths and weaknesses of existing buildings.
Surveys were conducted among inhabitants, craftspeople, material producers, traders, designers, etc., involved in the local production of houses. These surveys made it possible to identify the strengths and weaknesses of the existing and to identify whether these last were due to a lack of knowledge/know-how (in which case, this lack was made up for by appropriate training), or due to a lack of financial resources. In this case, work has been done to define, develop and then disseminate solutions adapted to the means of the different sections of the population.

Strategy 2.2: Co-design the project at its different stages. To scientifically validate the proposals made by the project.
The selection of the architectural and technical solutions, as well as the training / awareness raising strategies, and the decisions concerning the choice of the populations directly benefiting from the products provided by the project, are the result of an iterative consultation process carried out by the different actors of the project. This approach has been conceptualized by BUET with regard to decisions in the architectural and technical fields.

In the area of selection of project strategies and in particular the choice of beneficiaries and how to disseminate the project inputs to the largest possible number of people, this conceptualisation has been done by Caritas Bangladesh.

The technical approaches proposed (enhancement of existing or innovative technical proposals) have been scientifically verified and validated by the BUET team.

Strategy 2.3: Ensure the sustainable local availability, and for the entire population of the territory concerned, of the skills and knowledge needed to implement the solutions proposed by the project, or alternatives to them that will achieve a similar objective.

When selecting the craftspeople trained under the project, an effort was made to ensure that each inhabitant of the geographical areas concerned had access to a competent person, in accordance with local practices (transport distance, knowledge circles). The number of people trained has thus far exceeded the project's needs in terms of house construction. The selected craftspeople and craftswomen are those who actually work in these territories and with the target audience of the project in the normal course of time.

The trainings focused on the «why» of the technical solutions proposed, illustrating this through practical applications that explain the «how» of their implementation. This allowed local craftspeople to imagine alternatives to what was proposed by the project, in relation to the means and resources available to the inhabitants of the areas concerned.

Reuse of burnt bricks

SO3: Responses should be community-friendly, build community competence and cohesion, and not only focus on structural strengthening of buildings.

The protection of the habitat and the inhabitant was not limited to the improvement of construction techniques. It was also important to act in order to maintain and, if possible, strengthen local social cohesion through, on the one hand, the establishment of participatory strategies where all actors had the same level of information and decision-making and, on the other hand, the enhancement and dissemination of existing good practices in the field of solidarity and risk prevention (early warning systems, behaviour in the event of disasters, disaster preparedness, etc.).

Strategy 3.1: Accompany a beneficiary selection process led by local actors.

As a first step, and for each territory concerned, the project facilitated the setting up of a selection committee of persons directly benefiting from the proposed actions. The vulnerability criteria for the selection of project beneficiaries were defined by this committee, taking care to integrate those defined by the international community. An iterative process (proposal of beneficiaries, verification of compliance with vulnerability criteria, collection of comments from inhabitants, new proposals, etc.) until a consensus is reached on a definitive list of beneficiary families.

Strategy 3.2: Facilitate community involvement at all stages of the project.
The network of actors identified through the territorial diagnosis was involved at each stage of the iterative process that guided the project. By paying particular attention to grassroots communities, all actors have thus seen their power to act.

OS4: Reconstruction processes must be on the long-term.

Strategy 4.1: Establish a partnership between different sectors of activity in charge of habitat development.
In order to ensure the sustainability of the processes undertaken, the partnership established has deliberately targeted complementary actors with strong roots in Bangladesh and has developed a range of activities adapted to the capacities and operating methods of each of them. Thus, the academic community, guarantor of scientific expertise and government portage, the NGO sector, key actors of social innovation in disaster response, and the informal construction sector through local artisans and communities were involved.

Strategy 4.2: Strengthen the capacities of the CB team in the implementation of comprehensive approaches.
In order to ensure capacity building for CB staff, each activity with which they were not familiar was implemented in stages, integrating an observation phase, a learning phase, a consolidation phase and finally a capitalization phase.

Several seminars and workshops were set up in order to capitalize on the different experiences acquired by the teams working on the 8 districts where CB is involved in Bangladesh. These moments made it possible to pool everyone's experience and enrich CB's overall experience in the various areas dealt with.

Thanks to its own strategies for strengthening its teams internally (via the mobility of its teams between the different regional offices), CB has been able to strengthen the skills of all its field teams and find a strategy to perpetuate and enrich this knowledge over the years, without depending on the possible renewal of teams and by learning from each new experience acquired in the field.

Mid-term review workshop, Mymensingh

Strategy 4.3: Develop a Disaster Risk Preparedness program based on lessons learned.
After the various pilot projects implemented in 35 localities spread over the 8 regions where CB is active in Bangladesh, and after the local teams in place appropriated the tools and methods proposed, a reflection was carried out to anticipate possible future disasters. It focused on the definition of material and human needs, according to the scale of the disaster and giving maximum priority, in each case, to the mobilization of local resources and short circuits to access them.

Strategy 4.4: Integrate the approach into teaching at the university level.
Initially, conferences were organised by BUET. All the project's actors were invited to present theirs approaches, experience and the advances in research that the field activities have enabled to feed.
Then several teaching modules, drawn from lessons learned in the field, were developed and BUET students are regularly exposed to them (both undergraduate and postgraduate).

Strategy 4.5: Use the results of the project to raise international awareness.
An effort, particularly by CB and BUET, has been made to communicate widely about the approaches and its results to various key audiences in Bangladesh and elsewhere. This was done through participation in working groups, workshops carried by the postemergency reconstruction sector, exhibitions, seminars, conferences, etc...

Strategy 4.6: Share project results internationally.
BUET's researchers, in collaboration with those of the CRAterre research laboratory and CB professionals, have produced and published several scientific articles on the project, the proposed methodologies, the progress achieved in terms of research-action, etc.

Field visit, Sylhet

Owner of a Bengali house, Bandarban

TANGIBLE RESULTS

TECHNICAL PROPOSALS, CONSTRUCTION OF PROTOTYPES, TRAINED CRAFTSPEOPLE AND AWARENESS RAISING ACTIVITIES

- 35 Habitat models, adapted to the specificities of particular territories and Co-designed with the inhabitants of the latter, have been developed and made available to the national and international communities involved in postdisaster reconstruction
- 155 Pilot homes built in all of these territories (110 + 45 homes built under MDFLCH project)
- 48 houses repaired as part of training courses to reinforce the existing system
- 21 Training workshops given by CB in strengthening existing knowledge (16 + 5 under MDFLCH project)
- 383 Artisans trained during the realization of the demo houses, resulting in technical improvements, and reinforcement of the existing ones. (258 + 125 training under MDFLCH project)
- 773 Staff members from CB, other NGO, and government organizations, trained in the approach carried by the project (403 + 370 trained under MDFLCH project)

SELECTION PROCESS FOR DIRECT BENEFICIARIES

The process of co-selection of direct beneficiaries by all the local stakeholders has been documented, conceptualized and is today disseminated by CB to all its staff involved in the LCH response sector.

METHOD FOR ANALYSING THE STRENGTHS OF THE LOCAL BUILDING CULTURE.

The tools and methods allowing these analyses have been adopted by CB and shared within the international community involved in the issue of postdisaster housing. CB has developed its own tools to carry out territory diagnostics.

Elsewhere in the world, several actors such as UNHCR, IFRC, IOM to name but a few, have wished to benefit from these tools and methods in the projects they carry out in the field.

MDFLCH: Mainstreaming Disaster Friendly Low Cost House; CB: Caritas Bangladesh; NGO: Non-Governmental Organization; UNHCR: United Nations High Commissioner for Refugees; IFRC: International Federation of Red Cross; IOM: International Organization for Migration

Preparation of earth for construction

Cutting of cob wall

COMMUNITY DESIGN METHOD FOR HOUSING IMPROVEMENT AND LCH BASED ON GOOD PRACTICE AND EXISTING OPPORTUNITIES

The architectural solutions proposed by the project have been designed through ongoing consultation with the beneficiary communities. They include the house, but also the services (latrines, kitchens, access to water…) deemed a priority by all stakeholders (within the limits of the budgets available to the project or to the inhabitants). This method has been conceptualized by BUET. It has become a reference that serves as a support for the implementation of new habitat projects by CB.

AWARENESS RAISING AND TRAINING STRATEGIES

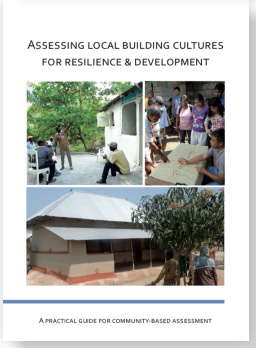
The objective of each action carried out in the field was to bring housing improvement solutions to all local communities, far beyond the direct beneficiaries of the project (the people for whom housing will have been built). To this end, specific awareness-raising strategies have been developed to mobilize and inform all of the project's target groups. However, these methods and tools have yet to be capitalized on so that they can be disseminated more widely, also outside the internal CB network.

DOCUMENTS BASED ON THE PROJECT LESSONS

DETAILED SHELTER RESPONSE PROFILE

Bangladesh, Local Constructive Crops for Sustainable and Resilient Habitats.

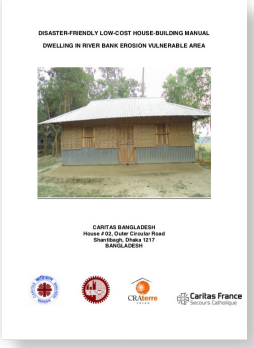
This Shelter Response Profile aims to provide a basic understanding of the context and key issues for shelter operations, including how to support humanitarian projects by making the best use of existing good practices among Local Building Cultures (LBC).



METHODOLOGICAL GUIDE FOR THE ANALYSIS OF LOCAL BUILDING CULTURES

Analysis of local building cultures for resilience and development.

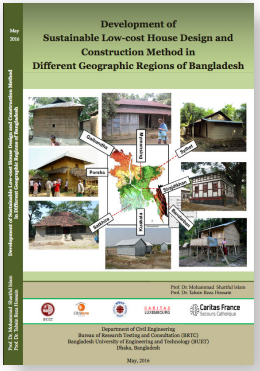
This manual is the result of a collective effort to share the results obtained in the field as well as in scientific research. The proposed methodology is intended to contribute to a better understanding of the existing situation in order to make postdisaster reconstruction projects more relevant.



CATALOGUE OF GOOD CONSTRUCTION PRACTICES

Inventory of existing or innovative solutions.

This document proposes a non-exhaustive list of solutions, technical or not, existing or innovative, classified by architectural elements, risk typologies and technical and financial accessibility for local populations.


Development of
Sustainable Low-cost House Design and
Construction Method in
Different Geographic Regions of Bangladesh
Prof. Dr. Mohammad Shorbtul Islam
Prof. Dr. Tahsin Reza Hossain
Department of Civil Engineering
Bureau of Research Testing and Consultation (BRTC)
Bangladesh University of Engineering and Technology (BUET)
Dhaka, Bangladesh
May, 2016

35 PROTOTYPES ADAPTED TO POSTDISASTER RECONSTRUCTION FOR 8 DIFFERENT ZONES IN BANGLADESH

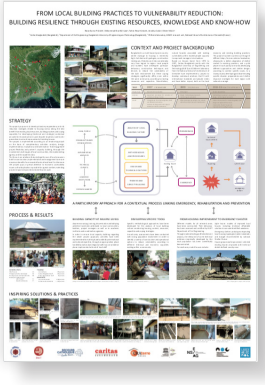
Technical description of 35 housing models, designed for 20 localities in Bangladesh in relation to the specificities of the existing local architectures in these territories.

This document presents the main characteristics of the territories diagnosed within the framework of the project. It briefly presents the specificities of the existing local architectures and proposes the plans and technical descriptions of the housing solutions adopted by the project for these specific sites.

METHODOLOGICAL GUIDES TO PROMOTE HABITAT MODELS IN RISK AREAS

They are 5 manuals for trainers, referring to reconstruction typologies related to specific risks (cyclones, droughts, floods, tidal waves, bank erosion).

Each of these documents is a pedagogical tool kit that integrates course proposals, teaching aids and reference material for trainers. They are intended to help trainers to set up training courses for local craftspeople in the field of habitat improvement in the face of natural disasters.


FROM LOCAL BUILDING PRACTICES TO VULNERABILITY REDUCTION:
BUILDING RESILIENCE THROUGH EXISTING RESOURCES, KNOWLEDGE AND KNOW-HOW
CONTEXT AND PROJECT BACKGROUND
STRATEGY
A PARTICIPATORY APPROACH FOR A CONTEXTUAL PROCESS LINKING EMERGENCY, REHABILITATION AND PREVENTION
PROCESS & RESULTS
INSPIRING SOLUTIONS & PRACTICES

SCIENTIFIC ARTICLES AND CONFERENCES

Several scientific articles, posters and exhibitions have been developed within the framework of the project.

These documents aim to share with the international community the idea that a detailed understanding of local building cultures is an indispensable starting point for the development of strategies to sustainably reduce the vulnerability of populations subject to natural hazards.

PROJECT TIME-LINE

1970 > 2007
LCH AND SHELTER SUPPORT
Following the Cyclone of November 1970, Caritas Bangladesh integrated shelter construction into its national disaster response programme. Since then, CB has supported the construction of 446,670 housing units in Bangladesh.

1970

Cyclone Sidr

2009 > 2010
PILOT PROJECT
The construction of 50 LCHs on two sites with very different realities (Sirajdikhan and Kuakata) makes it possible to assess the relevance of developing responses based on a good understanding of the local context.
CONVENTIONAL RESPONSE
Construction of 500 LCHs in two regions following the conventional approach of Caritas Bangladesh.

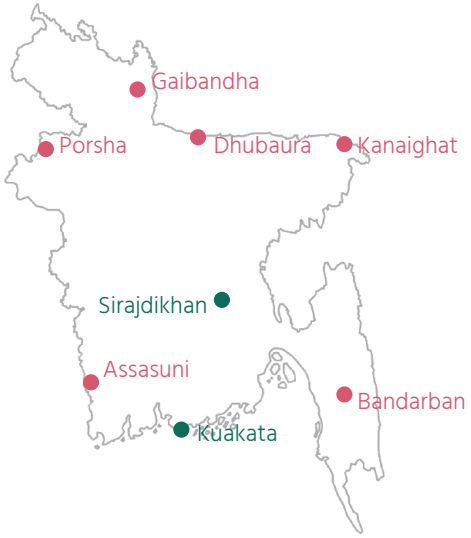
2009-2010

Cyclone Aila

Capitalization period of this manual

2007-2008

11/07 > 12/08
EXTERNAL EVALUATION POST SIDR
CRAterre's evaluation of CB's response to postdisaster reconstruction makes it possible to imagine new approaches, potentially based on existing local intelligences in the affected territories.



01/16 > 12/18

TECHNICAL CAPITALIZATION

Consolidation phase of lessons learned since the pilot project and dissemination of results at the national level. Production of methodological guides for the production of habitat adapted to 5 major risks.

CB contribute to the production of "Standard Guidelines for Rural Housing in Disaster Prone Areas of Bangladesh"; HBRI (Housing and Building Research Institute) under the umbrella of "Housing and Public Works Ministry".

2016-2018

2011-2015

External evaluation of the project by Build-Up Team for Humanitarian Action.

Since 08/17

Humanitarian crisis of Rohingya refugees

2019

10/11 > 03/15

PROJECT TO CONSOLIDATE ACQUIRED ASSETS

The method is applied in 6 regions of Bangladesh where CB works. Methodological approach, analysis, design, monitoring and evaluation - Implementation survey, analysis of local housing conditions - Capacity building for Caritas Bangladesh staff.

2019 > 2020

GLOBAL CAPITALIZATION

Production of a document synthesizing the methodological approach of the project and making the various tools developed available to the international community.

A STRONG PARTNERSHIP

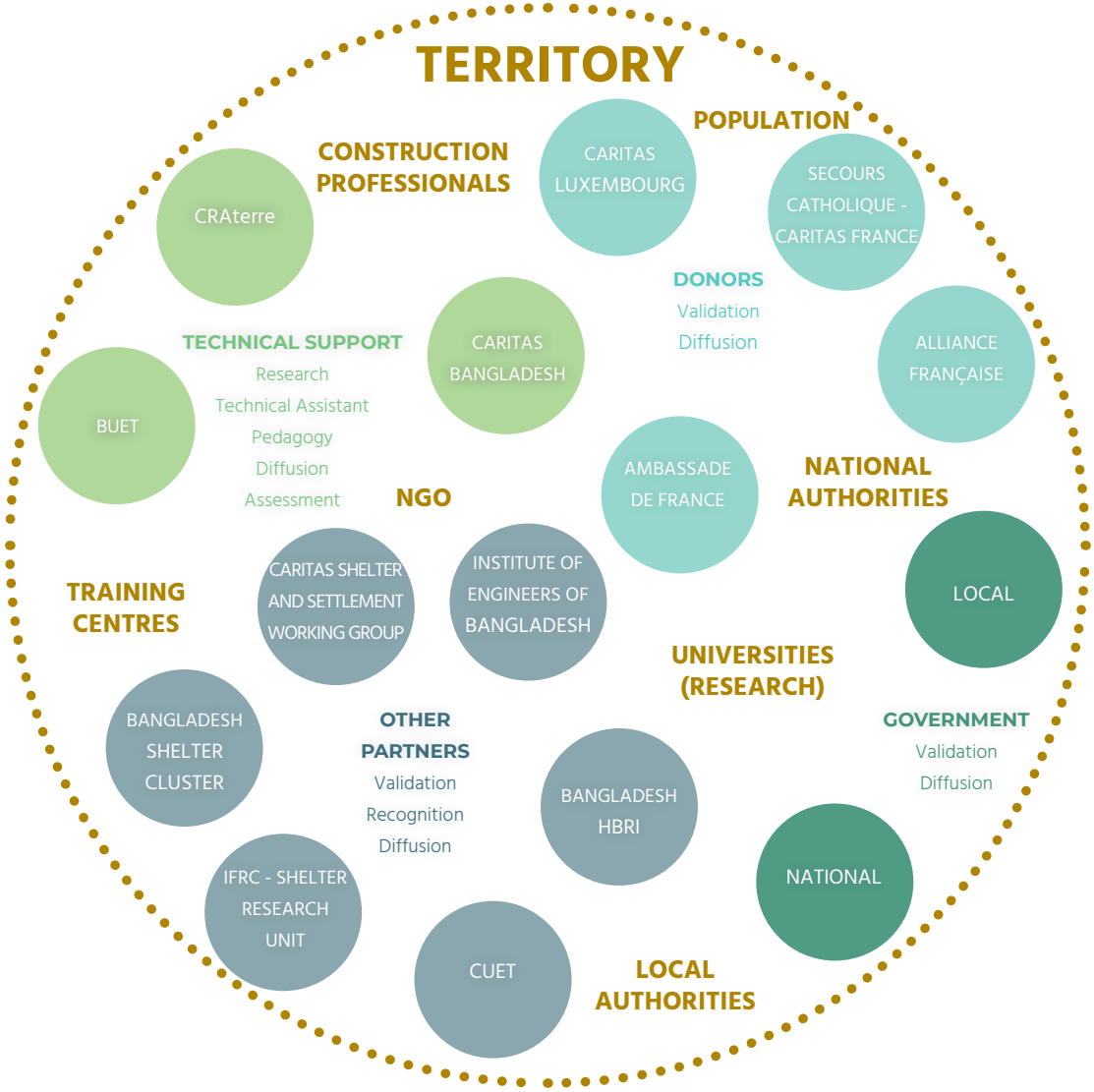
From the very beginning of the project, the focus that guided the whole process was to develop contextual solutions that combine international and national humanitarian standards, taking into account local needs and local capacities. Involving local actors (NGOs) with extensive field experience, actors from national academic circles (researchers, teachers) and international one's (specialists on local building cultures) as well as the more informal construction sector through local craftspeople and local communities, has enriched the quality of the proposed responses and ensured a certain guarantee of the sustainability of the processes undertaken.

Through an action-research approach, exchanges between academia and field work have enabled the proposed solutions to be constantly questioned and improved.

At each level and for each partner, tools and methods have been developed and the knowledge acquired during these years of collaboration have been disseminated as widely as possible. This allowed the impact of the project to be considerably amplified and facilitated a change of scale that today has an impact at the national and international level.

Sylhet

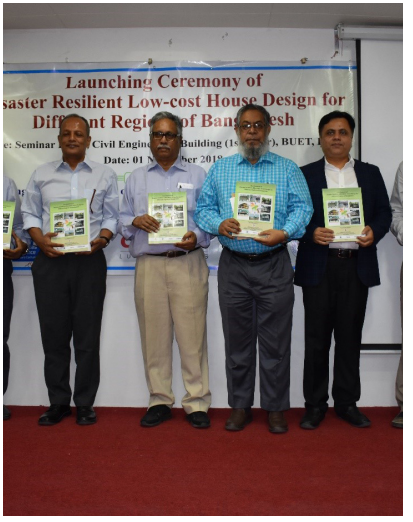
STAKEHOLDERS' INTERACTION DIAGRAM



CARITAS BANGLADESH

CB's action is directed towards the poorest people, especially marginalized and landless communities living in coastal areas, highly vulnerable to recurring natural hazards. The work of CB is strongly anchored in the regions, with an organizational structure that spans from national to village level. CB's action is based on a strong involvement of local communities to ensure their empowerment and capacity building, particularly for recovery and crisis management.

www.caritasbd.org



BUET

Bangladesh University of Engineering and Technology (BUET) is one of the most prestigious institutions for higher studies in Bangladesh. BUET's action focuses on technical support for the design, research and tests of materials and construction elements. BUET supports CB to equip its Disaster Management staff with the techniques and processes necessary to the preparation of durable and disaster risk resilient LCH units, through the use of local materials, capacities and skills.

www.buet.ac.bd

CRATERRE

CRAterre strives to propose relevant responses to the global housing challenge, paying attention to environmental protection, preservation of cultural diversity and the fight against poverty. CRAterre collaborates with ENSAG's team of researchers, professionals and trainers, and with many other partners to establish links between research, field activities, training, knowledge dissemination and outreach activities.

www.craterre.org

SECOURS CATHOLIQUE - CARITAS FRANCE

Secours Catholique - Caritas France is committed working alongside the most vulnerable by fighting against the causes of poverty and exclusion, based on the principle that men and women living in poverty are the main and primary actors of their own development. Among other activities, Secours Catholique-Caritas France finances and supports housing projects that benefit populations affected by natural disasters in the long term.

www.secours-catholique.org

CARITAS LUXEMBOURG

Caritas Luxembourg's engagement around the world (in more than 20 countries) involves supporting local partners in their fight against injustice, destitution and poverty. CL works alongside the victims of natural disasters and violent conflicts, and seeks to open up paths to justice, peace and reconciliation. CL's responses include humanitarian aid and emergency relief, followed by rehabilitation and reconstruction assistance, then development cooperation.

www.caritas.lu

OTHER PARTNERS

Other partners involved in the project included the regional governments of the various territories and the national government. Let us also mention the French Embassy and the Alliances françaises of Chittagong and Dhaka. Finally, there is the "shelter cluster in Bangladesh". Their participation has greatly contributed to a better recognition and dissemination of the project results at national and international level.

https://www.sheltercluster.org/asiapacific/bangladesh

TERRITORIAL DIAGNOSIS

THE LOCAL APPROACH

The diagnosis of territory is intended to help understand different dimensions of the production of human settlements. This analysis, from the local to the global level, will help to define the different strategies and activities of the project in order to provide a coherent response to present and future situations.
The diagnosis covers a variety of areas:

- Ways of living, using, maintaining, managing and developing buildings;
- The materials used, their origins: extraction, transformation, delivery to the building site;
- Implementation techniques, means, knowledge and know-how deployed;
- Environmental, energetic and thermal necessities;
- The organization, role and value of the different actors at these various stages.

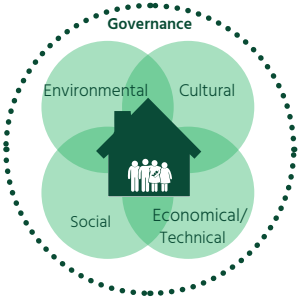
In the context of hazard-prone areas and recovery and reconstruction strategies, territorial diagnosis is particularly relevant for a variety of reasons:

- It builds on past experiences in responding to disasters, so as to understand the practices of local populations and the modes of intervention of the various actors involved. Indeed, for generations, the inhabitants have known how to take advantage of their natural environment and make use of the resources it can offer in terms of materials, renewable or not. They have also gained experience in how to manage the constraints imposed by this environment, including human and natural hazards.
- It helps mapping the different actors, specifying roles/responsibilities and strengths/weaknesses of each in the habitat production sector. This makes it possible to develop strategies adapted to local skills and their reinforcement, while integrating the interests of each stakeholder in the whole project process.
- It helps to understand the different rules governing the act of building (local culture, traditional law, laws defined by local and national governments, international laws to which world organizations and local governments are sometimes obliged to adhere when international solidarity is mobilized, etc.).
- Finally, it also makes it possible to take advantage of the existing situation in order to be able to define the best strategies and activities to implement. How is knowledge conveyed within the target communities (training?), how does information circulate (awareness-raising?), what are the local resilience strategies to be respected (respecting what already exists while proposing improvements that do not deny it), how to make the administrative and legislative environment evolve (adapting the rule to the realities of the territories)?

Sylhet

METHODOLOGY

With the objective of generating practical and contextual information to develop technical solutions to be implemented to improve local habitat and community resilience, a sequence of 13 activities was developed:



1. Familiarize yourself with the work area

Study existing information and present it to local stakeholders.

2. Prepare your tasks and tools

Decide on the role of each person in the team involved in the study of the territory and prepare the tools to be used for each activity.

3. Plan the fieldwork

Plan the work programme taking into account local circumstances.

4. Arrange a meeting with the local community

Introduce yourself to local communities to share the objectives of the collaboration.

5. Organize community mapping

Develop a common understanding of the impact of natural hazards in the region by drawing a map.

6. Conduct an accompanied tour of the sites

Visit the areas concerned on foot with the community in order to identify the local architectural typologies and their specificities.

7. Conduct interviews with owners

Carry out surveys among the inhabitants to gain a detailed understanding of local ways of living and the involvement of the project owner in its production.

8. Evaluate local techniques

Assess the strengths and weaknesses of the local habitat, taking into account its different architectural and use dimensions.

9. Conduct key informant interviews

Exchange with people (construction professionals, local authorities, other NGOs, etc.) who can provide specific information on the production methods of the local habitat and the different implications this may have on the territory.

10. Organize and moderate discussion groups

Exchange with small groups of people with knowledge and experience of construction and maintenance activities.

11. Synthesize the information collected

Analyse the information collected and prepare a preliminary report.

12. Validate the information collected with the community

Organize a feedback meeting with the local community to share and validate the main findings of the survey.

13. Define recommendations for project direction

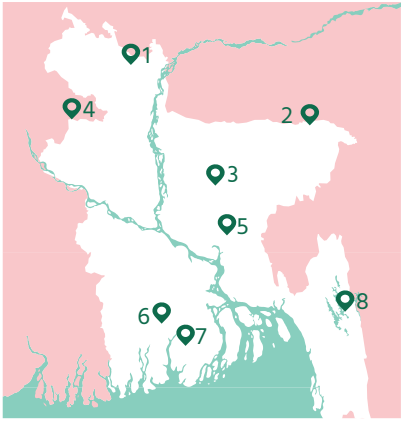
Produce a final report, specifying and justifying recommendations for the implementation of strategies and activities to help the community overcome the problems identified.

ANALYSIS OF LOCAL BUILDING CULTURES

Inspired from the work of Annalisa Caimi, Bandarban

Community meetings
Community mapping
Personal meetings
Observations
Technical meetings
Accompanied visits
Technical notes
Focus groups

RESULTS



*8 zones, 35 territories diagnosed

1. Rangpur

CLIMATE PROFILE:
Dry and cold.
TOPOGRAPHY:
Flat land near the river bank.
RISKS:
Floods, river bank erosion (with major landslides), high winds, earthquakes, cold waves.

DESCRIPTION:
The houses are usually built on a platform of earth to raise them up and thus protect them from flooding, which is frequent in the area.
The walls can be made of fibre mats of different origins and produced locally, iron sheets, or be the result of a mixture of the use of these different materials.
In areas less prone to flooding, walls can also be made of compacted earth (cob) or adobe.
The roofs are mainly made of thatch or thin iron sheets.

MATERIALS AVAILABLE:
Soil, bamboo, fibres, reinforced concrete posts, iron sheets, straw, wood, etc.

ONE POINT OF ATTENTION (AMONG OTHERS) THAT THE LOCAL STUDY IDENTIFIED:
In Dinajpur district, the design of houses incorporates the risk of riverbank failure. The houses must be able to be moved urgently before the collapse of the earthen dikes where the inhabitants live along the riverbank (in connection with their economic activities as fishermen/farmers). The destroyed sites are drowned in the new riverbed. People don't move back here, but rebuild on the new bank. This dynamic concerns hundreds of villages.

These populations have developed architectural and technical solutions that allow the rapid dismantling of their entire habitat into elements whose size and weight allow easy transport to an area not exposed to risk. They are thus able to save their homes and possessions and then very quickly rebuild their habitat on the new river bank.

Riverbank failure vulnerable area, Dinajpur

Mud wall and Ekor fence, Sylhet

2. Sylhet

CLIMATE PROFILE:
Dry and cold.
TOPOGRAPHY:
Plains and hills.
RISKS:
Floods, high winds, earthquakes, cold waves, mini «flash floods».

DESCRIPTION:
The houses are generally built on a platform of earth to raise them up and thus protect them from floods and «flash floods» resulting from embankment breaches, which are frequent in the area.

The lower parts of the walls are generally thick and built with a material that is resistant, at least for a time, to flooding (Cob, fired bricks). This thick part of the wall also allows heat to accumulate during the day and to temper the house during cold periods (at night). The upper parts of the walls are light, made with mats of various materials, sometimes iron sheets.

Even if stones (pebbles) are available, their use as a building material is still unknown.

The roofs are mainly made of thatch or thin iron sheets.

MATERIALS AVAILABLE:
Earth, baked bricks, bamboo, fibres, reinforced concrete posts, iron sheets, straw, wood, river pebbles, etc.

ONE POINT OF ATTENTION (AMONG OTHERS) THAT THE LOCAL STUDY IDENTIFIED:
In order to protect themselves from both floods and the cold, part of the population in the social strata that are beginning to emerge from poverty is investing in housing made of fired bricks. The walls are extremely thin (6 cm). While this habitat has some relevance to face cold and flood, it is extremely vulnerable and dangerous in the event of earthquakes. Strong action should be taken to inform this population of the risks they run.

Fired bricks' house, Sylhet

3. Mymensingh

CLIMATE PROFILE:
Dry and cold.
TOPOGRAPHY:
Plains.
RISKS:
Flash flood, bank erosion, strong north-west wind.

DESCRIPTION:
The houses are generally built on a platform of earth to raise them up and thus protect them from the ''flash floods'' resulting from dyke breaches, which are frequent in the area. It is quite common to see groups of buildings built on platforms from 1 to 2 meter high.

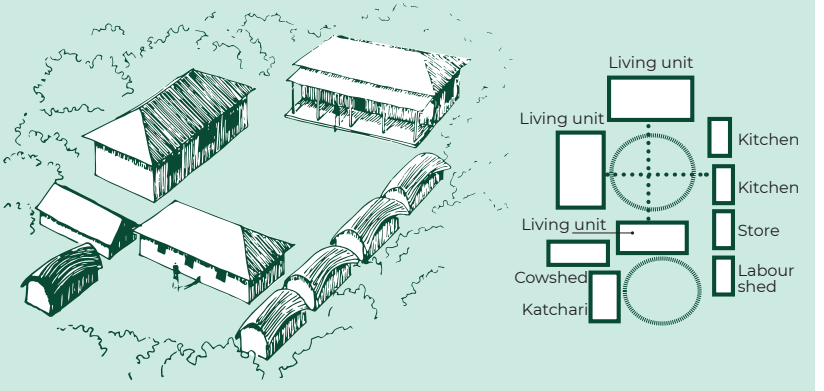
The walls are made of mats or iron sheets. They are protected at their base by the interposition of a row of fired bricks (protection against rust and rot).

The roofs are mainly made of thatch or thin iron sheets. They almost always have four slopes (for better resistance to high winds).

MATERIALS AVAILABLE:
Earth, bamboo, reinforced concrete posts, iron sheets, straw, wood, etc.

ONE POINT OF ATTENTION (AMONG OTHERS) THAT THE LOCAL STUDY IDENTIFIED:
Termites are relatively present in the area and can cause extensive damage to build structures. In local constructions, particular attention is paid to «isolate» the wooden structure from the walls and posts that support it. This results in the installation of isolated support points made of fired bricks or inverted pottery, on which the timber of the framework comes to rest. No wood is inserted directly into the masonry. This precaution makes it possible to better control termite attacks on roofs and to treat them.

Pottery elements isolate the framework from the columns that support it



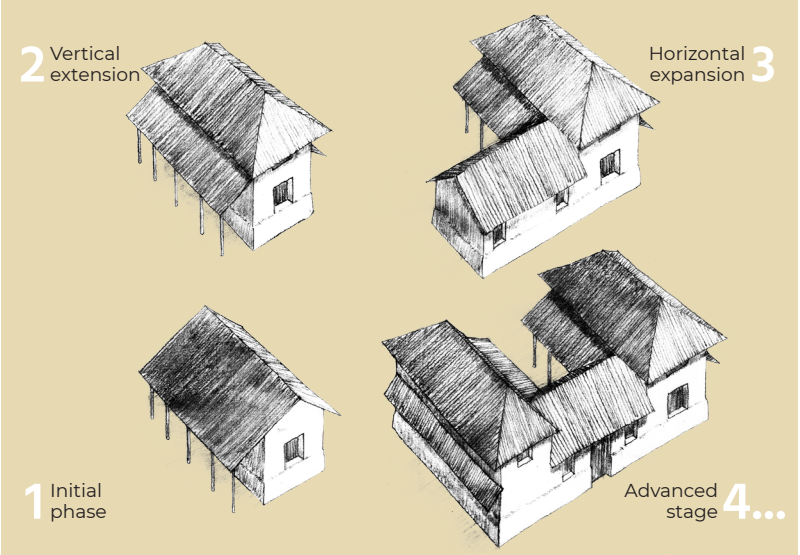
Housing unit in Mymensingh - Image from the work of Haq, S.U.

4. Rajshahi

CLIMATE PROFILE:
Dry and cold.
TOPOGRAPHY:
Rough terrain.
RISKS:
Drought, cold wave, earthquake, storm.

DESCRIPTION:
The houses are mostly made of thick Cob walls. They are evolutionary and often reach two or two and a half storeys in their completed forms. There are also houses made of thin mud walls. The roofs are mostly made of thin iron sheets. They almost always have four slopes in their final shape (for better resistance to high winds).

MATERIALS AVAILABLE:
Earth, bamboo, reinforced concrete posts, wood, galvanized iron wire, corrugated iron sheets.



Stages of House Evolution, Porsha (see pp. 46-47)

SOME POINTS OF ATTENTION (AMONG OTHERS) THAT THE LOCAL STUDY IDENTIFIED:
Horizontal bamboo rod reinforcements are inserted into the thick Cob masonry, about every 80 cm high, to prevent thieves from digging into the walls to get into the houses. It should be noted, however, that this practice is also found in many territories of the world subject to earthquakes and where Cob construction is present. It seems relevant to recommend that this practice be continued, even if the security problem in the area is resolved.

It should be noted that the houses in this area are evolutionary. The person who builds his first room already imagines what his house will become in 20 or 150 years (depending on his means and those to come from his family). Thus, the first house is often made up of two rooms, one of which is entirely devoted to accommodate the beginning of a staircase that will allow future access to the first floor. Similarly, the roofs of the intermediate stages are never final.

They are often flat (when made of iron sheets) and are implemented in such a way as not to pierce any iron sheet, thus anticipating the easy reuse of galvanised iron sheets. These intermediate situations can last a very long time, sometimes more than a generation...

5. Dhaka

CLIMATE PROFILE:
Dry and cold.
TOPOGRAPHY:
Base lands, flood zones.
RISKS:
Floods, high winds.

DESCRIPTION:
The villages are located on platforms up to several meters high. On these platforms, the houses themselves are raised with platforms 40 to 60 cm high.

The walls are made of light materials (mats, wood panels, iron sheets) attached to a structure of posts, most often of reinforced concrete. Sometimes the bottom of the walls is made of fired bricks.

The roofs are mostly made of iron sheets (two slopes). Some thatched roofs are available. Houses often have one and a half or two storeys.

MATERIALS AVAILABLE:
Earth, bamboo, reinforced concrete posts, wood, galvanized iron wire, corrugated iron sheets.

Dhaka

ONE POINT OF ATTENTION (AMONG OTHERS) THAT THE LOCAL STUDY IDENTIFIED:
During major floods, families take refuge outside the villages. But one person stays in the house to handle any emergency. They live in the upper part of the house, on the first floor or half floor. This explains the choice of a gable roof (= more space) and therefore requires an accessible floor for at least one person (adequate section of the beams supporting the floor should be provided).

Two-storey houses, Sirajdikhan

6. Khulna

CLIMATE PROFILE:
Hot and humid.
TOPOGRAPHY:
Coastal plains and plains interspersed with rivers.
RISKS:
Tidal waves, cyclones, floods, strong winds, high concentration of salt in the air and soil.

DESCRIPTION:
The houses are built on earthen platforms that can be more than one metre high.

The walls are made of Cob. The house is built in stages. A central core consisting of three walls and a panelled facade is first made and covered, then extensions on all four sides are made. The walls can be made of earth (Cob) or light materials (wood, mats).

The roof, with four slopes, is still mainly made of fired tiles, sometimes thatch. But more and more iron sheets roofs are appearing.

MATERIALS AVAILABLE:
Earth, bamboo, reinforced concrete posts, wood, galvanized iron wire, corrugated iron sheets, clay tiles.

SOME POINTS OF ATTENTION (AMONG OTHERS) THAT THE LOCAL STUDY IDENTIFIED:
The Cob walls are reinforced horizontally (every 3 feet high) and at their corners by the horizontal insertion of beds of bamboo slats.

The roofs are particularly protected against high winds. Local people are wrapping the roofs with old fishing nets. They anchor the framework to the ground, via iron wire ties between stones buried in the ground and the main elements of the framework. To avoid the risks of corrosion, the buried parts of these links are never made of ferrous material, the inhabitants use fibre or rubber links (old bicycle tyres...).

The earthen façades exposed to the prevailing rainfall are protected by plant mats which are regularly renewed.

Bamboo inclusion in walls

Roof anchorage with tires

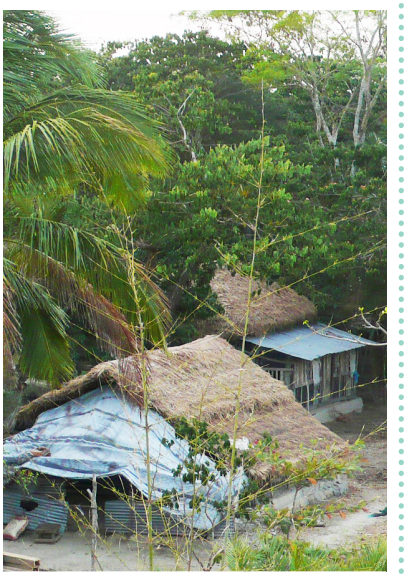
7. Barisal

CLIMATE PROFILE:
Hot and humid.
TOPOGRAPHY:
Coastal plains.
RISKS:
Tidal waves, hurricanes.

DESCRIPTION:
The houses are built on earthen plinths that can be more than one metre high.
The walls are made of light materials, iron sheets or bamboo mats, supported by a structure usually made of reinforced concrete columns.
The roof is almost systematically four-sloped (better behaviour in strong winds), mostly made of iron sheets or thatch.

MATERIALS AVAILABLE:
Earth, bamboo, reinforced concrete posts, wood, galvanized iron wire, corrugated iron sheets...

SOME POINTS OF ATTENTION (AMONG OTHERS) THAT THE LOCAL STUDY IDENTIFIED:
The house is deliberately low (2 to 2,5 m high) to offer a minimum wind catch.
The verandas are disconnected from the main roof.
Houses are often protected by a vegetated environment planted for this purpose.


Traditional house, Barisal

Barisal

8. Chittagong

CLIMATE PROFILE:
Hot and humid, with cold spells inland.
TOPOGRAPHY:
Partly coastal plains and hills inland.
RISKS:
Flash floods, cyclones, rising tides, landslides, earthquakes and fires, cold waves.

DESCRIPTION:
Hilly areas
There are two types of houses in this area:

The houses on stilts (Machan).
They are the work of the indigenous people.
A platform is made with a precise number of wooden posts anchored in the ground that serves as a support for a platform on which the house is erected.
The walls are made of light materials, usually woven bamboo mats.
Roofs can be thatched or iron sheets.

Houses on the ground.
They are the result of a migrant population that is gradually settling in the indigenous villages. These houses are built on earthen embankments or on excavated land (not flat areas). The walls are made of light materials (bamboo mats, iron sheets) with sometimes their lower part made of fired bricks.
The roofs are similar to those of the Machan model.

MATERIALS AVAILABLE:
Earth, bamboo, reinforced concrete posts, wood, galvanized iron wire, corrugated iron sheet...

SOME POINTS OF ATTENTION (AMONG OTHERS) THAT THE LOCAL STUDY IDENTIFIED:
The number of posts carrying the Machan platform is apparently fixed by cultural rules. This must be taken into account before proposing «improvements».
The layout of the rooms between Machan houses and houses on the ground floor is totally different. It is not possible to offer ONE house model to these two populations, who live mixed together in the same villages.

Traditional house and Bengali house, two necessary solutions for the same village, Bandarban

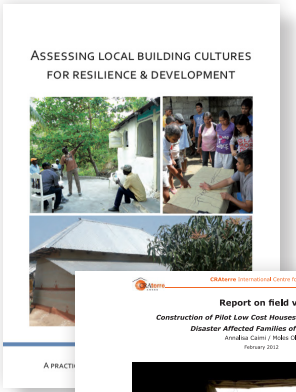
Since the first stage of construction, a staircase is built, in anticipation of a future vertical extension, Porsha.

Evolving house in an advanced stage, Porsha

PROJECT PRODUCTION

CAIMI, Annalisa, 2015. « Assessing local building cultures for resilience & development. » [Online]. Villefontaine: CRAterre. 121 p. ISBN 978-2-906901-86-5. Available at: < https://archive.org/details/Assessing_Local_Building >

CAIMI, Annalisa, MOLES, Olivier, 2012. « Report on field visit, construction of pilot Low Cost Housing (LCH) project for the Disaster Affected Families of Bangladesh » [Online]. Grenoble: CRAterre - ENSAG. 83 p. Available at: < https://archive.org/details/pilot_LCH_Bangladesh >



Report on field visit
Construction of Pilot Low Cost Houses (LCH) Project for the Disaster Affected Families of Bangladesh
caritas

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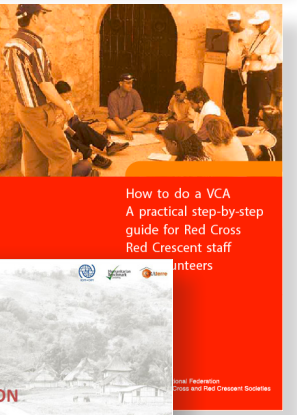

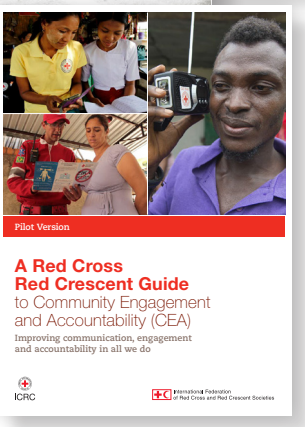

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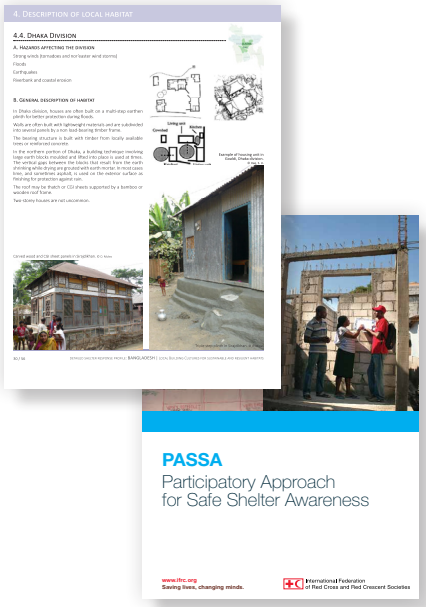

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CO-DESIGN OF STRATEGIES AND SOLUTIONS

THE PARTICIPATIVE APPROACH; AN UNAVOIDABLE STRATEGY IN ORDER TO PROPOSE A RESPONSE ADAPTED TO LOCAL REALITIES.

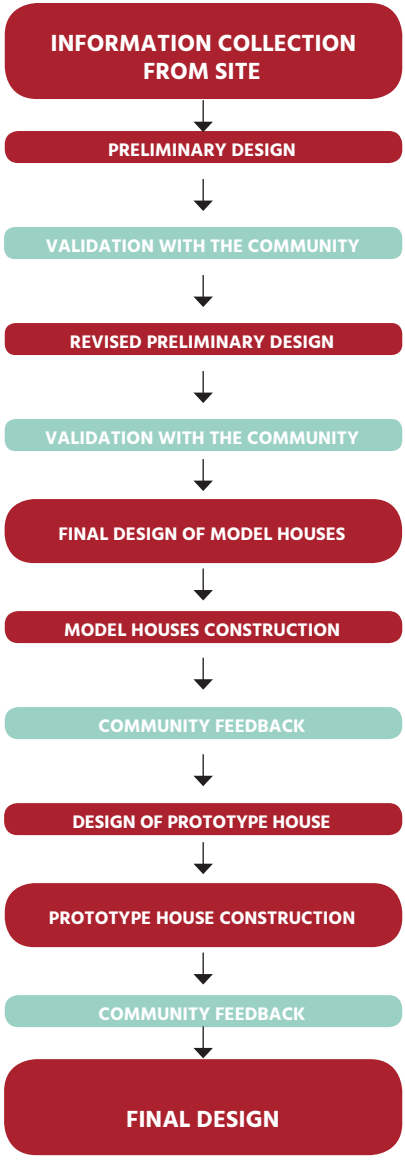
The community and participatory approach was favoured at all stages of the project, including the design and implementation phases of all the technical and architectural solutions that were proposed.

For each territory, this resulted in an initial co-diagnosis of existing buildings. Throughout the process, on-going discussions with local stakeholders have considerably reduced subjective misinterpretations of the qualities and shortcomings of the existing system. Errors that could come from external stakeholders who did not have all the keys to understand the existing or who did not adopt an adequate analysis posture.

The second step, which reinforces the first, is to ensure that, at the end of the diagnostic phase, each party has a similar analysis of the information collected. To this end, the understanding by «outside expertise» of local ways of living must be restituted, discussed and validated with the populations concerned.

As experience was gained during the project, BUET was able to conceptualise this approach, which has become an integral part of the project methodology used by Caritas Bangladesh in its housing improvement projects. This methodology has also been adopted by CRAterre and many other partners when setting up projects outside Bangladesh.

The success of the project is the result of the pooling of local knowledge with that made available by external actors. From the outset, the stakeholders favoured a posture of listening and understanding what each of them brought to the table. This is not without effort, as this position often requires questioning, mainly by parties in a privileged (or strong) position, such as representing a donor, academic and scientific knowledge, or an overly ideal vision of the models resulting from a Western globalized way of thinking.



Participatory house design workshop, Mymensingh

Participatory house design workshops, Dinajpur

ENHANCE AND IMPROVE THE EXISTING SITUATION, HAVE A POSITIVE IMPACT ON THE DIFFERENT PILLARS OF SUSTAINABLE DEVELOPMENT.

The diagnosis of the existing situation allows to analyse, understand and then take fully into account the strengths and weaknesses of the local building cultures. The aim is to highlight existing good practices, to validate them scientifically if necessary, and to develop relevant solutions in order to remedy the weaknesses identified.

In the search for solutions to the weaknesses of the existing situation, particular importance must be attached to the impact of the project on the improvement of the overall environment in which the population concerned evolves. Thus, it is not just a matter of providing shelter to people who are in critical need. It is also a question of ensuring that the maximum amount of money spent on relocating people can first and foremost feed local economies.

And therefore to prioritize the use of materials that have a positive impact on this economy, as well as local human resources, both in terms of project staff and actors involved in the implementation of activities. It is also a question of ensuring that the knowledge conveyed by the project is relevant to the existing labour market and is part of the skills of the actors producing the Habitat locally.

It is also important to propose solutions that are the result of an in-depth analysis of the local and global impacts generated. Thus, favouring the use of a material that has little impact on the local environment, but a great deal on the global environment, over a product that can have a strong impact on the local environment but no significant impact on the global environment is a subject that deserves reflection. The example of the non-use of local wood for construction or fuel (due to its scarcity and the risks of deforestation) in favour of alternative materials (building materials that consume a lot of grey energy - iron sheets, cement, etc.) must be debated. Indeed, is it not more relevant, as soon as possible, to develop activities and strategies to support and sustain sectors that can reduce the impact of global warming, while preserving the autonomy of local populations?

INNOVATIONS

Stone Foundations / Raised Katla

Bracing / Brick layer

Bamboo Strips / Quick Disassembly

EXAMPLES OF COMPLETED LCH AMONG 35 SOLUTIONS

Materials: Mud, bamboo, jute, batha plant, reinforced concrete posts, corrugated galvanised iron sheets, straw, wood

Joints in the post and connection between post and roof system for quick dissemble

Construction size: **24'x10.5'**

Price: **75 000 BDT**

DINAJPUR

Materials: earth, bamboo, reinforced concrete posts, timber, binna grass, galvanized iron wire, corrugated galvanised iron sheets

Mud stabilization with natural fibres to reduce wall thickness

Construction size: **23'x12' veranda 23'x6'**

Price: **80 000 BDT**

RAJSHAHI

Materials: Earth, bamboo, reinforced concrete posts, corrugated galvanised iron sheets, tiles, golpata, wood

Raised plinth, mud wall stabilization with fibres, bamboo strips in layers to enhance ductility

Construction size: **26'-6''x20'-6''**

Price: **85 000 BDT**

KHULNA

Materials: Earth, bamboo, reinforced concrete posts, galvanized iron wire, corrugated galvanised iron sheets, straw, wood

Reinforced concrete and timber framing system, stepped high earth plinth, two parts bamboo fences, mezzanine to save goods during flood

Construction size: **18'x10' with 5'' veranda**

Price: **63 000 BDT**

DHAKA

Materials: earth, bamboo, brick, galvanized iron wire, corrugated galvanised iron sheets, straw, wood

Four pitched roof for better wind resistance, reinforced concrete and timber framing system, stepped earth plinth, two parts bamboo fences

Construction size: **18'x10', veranda 6' wide**

Price: **75 500 BDT**

BARISAL

Materials: Earth, bamboo, reinforced concrete posts, corrugated galvanised iron sheets, straw, wood

Stepped plinth, roofing extension to increase the life of the fence, two parts fences, platform for storing goods

Construction size: **18'x10' veranda 12.5'x5'**

Price: **85 000 BDT**

MYMENSINGH

Materials: Earth, bamboo, reinforced concrete posts, timber, galvanized iron wire, corrugated galvanised iron sheets

Improved plinth with available stones, bracing to increase lateral wind resistance

Construction size: **24'x11', veranda 4' wide**

Price: **90 000 BDT**

SYLHET

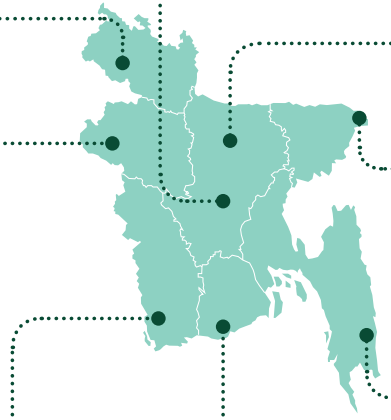
Materials: earth, bamboo, brick, galvanized iron wire, corrugated galvanised iron sheets, straw, wood

Machan house, with suitable timber treatment, katla joint and bracing to enhance lateral load carrying capacity

Construction size: **18'x15'**

Price: **75 000 BDT**

CHITTAGONG



Riverbank erosion · Tsunamis · Cyclones · Fires · Landslides

Droughts · Earthquakes · Cold Wave · Floods · Strong winds

Materials: mud, bamboo, timber
Foundations: stone
Plinth: stone (main house) & mud (veranda)
Columns: reinforced concrete and bamboo posts with or without katla
Fences/Walls: mud and Ikar
Roof: wooden truss, four pitched corrugated galvanised iron sheets
Reinforcement: corner bracing
Openings: 1 main door + 1 inside door to connect rooms
Joints: nails, notches, galvanized iron wire
Ceiling: protection from heat and cold - rain water harvesting system

Sylhet - Kanaighat: type - 1.1 130 000 BDT

Rajshahi - Tarash: type - DP2 85 000 BDT

Materials: mud, bamboo, timber and binna grass
Foundations: bamboo posts/katla embedded in soil (1-2 ft)
Plinth: mud
Columns: reinforced concrete and bamboo posts with or without katla
Fences/Walls: bamboo mat over corrugated galvanised iron sheets
Roof: wooden truss, four pitched corrugated galvanised iron sheets
Reinforcement: corner bracing
Openings: 1 main door + 1 inside door to connect rooms
Joints: nails, notches, galvanized iron wire
Ceiling: protection from heat and cold - rain water harvesting system

Riverbank erosion
Droughts
Tsunamis
Earthquakes
Cyclones
Cold Wave
Fires
Floods
Landslides
Strong winds

Materials: mud, bamboo, reinforced concrete posts, galvanized iron wire, corrugated galvanised iron sheets, straw, wood
Foundations: wooden/ bamboo posts embedded in soil (1-2 ft)
Plinth: mud
Columns: reinforced concrete, wooden and bamboo posts
Fences/Walls: corrugated galvanised iron sheets
Roof: wooden truss, four pitched corrugated galvanised iron sheets
Reinforcement: corner bracing
Openings: 1 main door + 1 inside door to connect rooms
Joints: nails, notches, galvanized iron wire
Ceiling: protection from heat and cold
Treatment: (bamboo & wood): water treatment & partial chemical treatment

75 000 BDT

Chittagong - Pekua: type - DP3

90 000 BDT

Chittagong - Bandarban typologies

Materials: mud, bamboo, brick, galvanized iron wire, corrugated galvanised iron sheets, straw, wood
Foundations: wooden/ bamboo posts embedded in soil (1-2 ft)
Plinth: machan (traditional) with wooden posts directly in the ground and rest on katla - mud (Bengali)
Columns: wooden poles with katla
Fences/Walls: bamboo mat (2 parts)
Roof: wooden truss, four pitched corrugated galvanised iron sheets
Reinforcement: corner bracing
Openings: 1 main door + 1 inside door to connect rooms
Joints: nails, notches, galvanized iron wire, plastic ropes
Ceiling: protection from heat and cold, wooden tie beams in odd number
Treatment: (bamboo & wood): water treatment & partial chemical treatment

Bengali house

Traditional house

Materials: mud, bamboo, jute ropes, jute stick, batha plant, reinforced concrete posts, corrugated galvanised iron sheets, straw, wood
Foundations: wooden/bamboo posts (katla) embedded in soil (1-2 ft)
Plinth: mud (2/3 steps)
Columns: bamboo and reinforced concrete posts
Fences/Walls: Tati (made of bamboo branch/slice and mud plaster)
Roof: wooden truss, four pitched corrugated galvanised iron sheets
Reinforcement: corner bracing
Openings: 1 main door
Joints: nails, notches, galvanized iron wire
Ceiling: protection from heat and cold
Treatment: (bamboo & wood): water treatment & partial chemical treatment

Rangpur - Chirir Bandar: type - DP2 75 000 BDT

Khulna - Rampal: type - DP3 85 000 BDT

Materials: mud, bamboo, reinforced concrete posts, corrugated galvanised iron sheets, tiles, golpata, wood
Foundations: bamboo posts/ katla embedded in soil (1-2 ft)
Plinth: mud (2/3 steps)
Columns: reinforced concrete posts at the corners of outer periphery + treated bamboo on katla
Fences/Walls: bamboo mat (2 parts)
Roof: wooden/ bamboo truss, 4 pitched & disconnected veranda roof, covered by corrugated galvanised iron sheets (main) & golpata (veranda)
Reinforcement: corner bracing
Openings: 1 main door + 1 inside door to connect rooms
Joints: nails, notches, galvanized iron wire
Ceiling: protection from heat and cold
Treatment: (bamboo & wood): water treatment & partial chemical treatment

Riverbank erosion · Tsunamis · Cyclones · Fires · Landslides
Droughts · Earthquakes · Cold Wave · Floods · Strong winds

Materials: mud, bamboo, timber, Binna grass
Foundations: mud (earth) - bamboo posts/katla embedded in soil (1-2 ft)
Plinth: mud (2/3 steps)
Columns: reinforced concrete and bamboo posts with or without katla
Fences/Walls: Tati (made of bamboo branch/slice and mud plaster)
Roof: wooden truss, four pitched & veranda roof is disconnected from main roof, corrugated galvanised iron sheets
Reinforcement: corner bracing
Openings: 1 main door + 1 inside door to connect rooms
Joints: nails, notches, galvanized iron wire
Ceiling: protection from heat and cold - rain water harvesting system

Earth construction

Bamboo frame construction

90 000 BDT (earth)
80 000 BDT (bamboo)

Rajshahi - Porsha typologies

85,000 BDT

Mymensingh - Kalmakanda: type - DP2

Materials: mud, bamboo, reinforced concrete posts, corrugated galvanised iron sheets, straw, wood
Foundations: bamboo posts/ katla embedded in soil (1-2 ft)
Plinth: mud (two/three steps)
Columns: reinforced concrete and bamboo posts with or without katla
Fences/Walls: corrugated galvanised iron sheets and bamboo mat (2 parts)
Roof: wooden/ bamboo truss, four pitched & disconnected veranda roof, corrugated galvanised iron sheets
Reinforcement: corner bracing
Openings: 1 main door
Joints: nails, notches, galvanized iron wire
Ceiling: protection from heat and cold
Treatment: (bamboo & wood): water treatment & partial chemical treatment

Barisal

RESULTS

- 35 housing models, (approaches for new construction, but also techniques for repairing or reinforcing existing buildings), are developed and made available to local communities and the international community;
- Co-design methods and tools have been documented;
- The project teams (CB, CRAterre, BUET) have taken ownership of the approach and disseminated it, teaching it within their own networks;
- Conferences and workshops were organized by the project promoters at local, national and international levels. The approach is documented and accessible to those who wish to use it. Scientific articles have been published.
- International aid actors are aware of the proposed methodology and some of them, through the Global Shelter Cluster, are involved in refining and better disseminating it.

LESSONS LEARNED

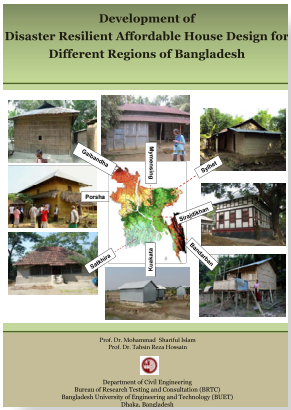
The development of a solution to a given problem cannot be standardized or globalized. Without knowledge of the field and without exchanges / discussions with the populations directly concerned, what will be set up is unlikely to become a sustainable part of the local built landscape. The solutions developed for each of the contexts analysed in the project vary surprisingly. This includes:

- The nature of the materials used,
- The proposed habitat model (the way of living and inhabiting may vary from one community to another within the same village),
- The level of finishing «imposed» by the project must incorporate local practices for the further development of the shelter provided,
- The type of target audience the work should address (which population is really at risk... Not always the poorest....),
- Technical approach (stronger houses? Or easier to dismantle quickly, transport from one site to another? Or easier to rebuild).

Local knowledge is often held by individuals who have acquired it through self-education. Some, but not all, are democratized within communities. The documentation and sharing of this local knowledge for the benefit of the entire community makes it possible to propose to the latter more than 80% of the solutions that it can easily appropriate, on the cultural, economic, technical and environmental levels.

The knowledge documented on a territory, in its initial or adapted form, is an important source of possible improvement of existing or evolving situations in other regions (changes in situations that put a community in a new situation, but which are already the daily life of another community).

On-site evaluation of the LBC with craftspeople and inhabitants



PROJECT PRODUCTION

ISLAM, Mohammad Shariful, HOSSAIN, Tahsin Reza, BUET, CRATERRE, CARITAS BANGLADESH, CARITAS FRANCE, CARITAS LUXEMBOURG, 2017. « Development of Disaster Resilient Affordable House Design for Different Regions of Bangladesh » [Online]. Dhaka: BUET. 283 p. Available at:
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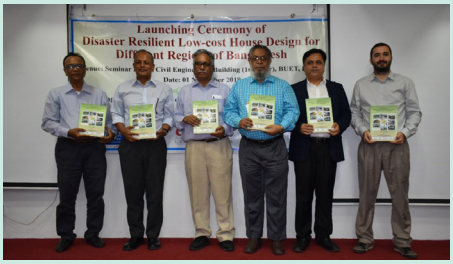
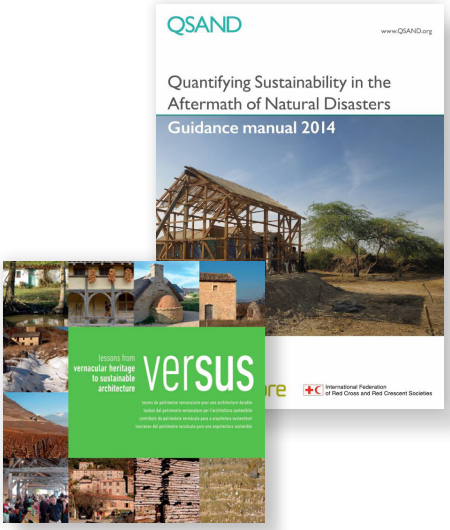


TO FIND OUT MORE

QSAND is a free-to-use sustainability and resilience framework developed by BRE on behalf of the International Federation of Red Cross and Red Crescent Societies (IFRC). As a part of their commitment to sustainable development, IFRC commissioned the development of QSAND to promote sustainable response and reconstruction activities in the aftermath of disasters.
BRE Trust, IFRC, BREEAM, CRS, 2014. « QSAND | Quantifying Sustainability in the Aftermath of Natural Disasters » [Online]. (modified on February 27, 2020) Available at: < https://www.qsand.org/ >



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On-site analysis of Local Building Cultures with craftspeople and inhabitants

THE NEED FOR A VARIETY OF RESPONSES TO ANSWER A VARIETY OF NEEDS

Natural disasters often affect an entire community, regardless of its social level. Recovery of the poorest is longer and more difficult. But these two factors are often proportional to the speed of recovery of the middle -and high- income groups, since they are often the driving force behind local economies. It therefore seems relevant to develop responses (postdisaster & prevention) that integrate aspects that improve the safety of everyone in the area of intervention.

There is a broad consensus that the priority targets of the projects are the poorest of those affected by a disaster, and this is not to be questioned. But it is possible, through support for these people, to disseminate a whole range of relevant solutions adapted to meet the needs and expectations of more affluent people. This has the advantage of not stigmatizing a specific population by addressing everyone in a community, and of showing that the habitat models proposed can also evolve towards a more spacious, comfortable and rewarding habitat.

In some cases, the most vulnerable to certain future hazards may not be the poorest. In our experience in Bangladesh, middle-income populations in the Sylhet region, who build with thin walls of fired bricks, are thus protected from the risk of slow flooding, but they are particularly exposed to very serious human and material damage in the event of an earthquake, or even in the event of a violent rise in water levels due to the breaking of river dikes.

"... address everyone in a community so as not to stigmatize, but also to preserve local socioeconomic dynamics that promote early recovery."

Inhabitant transporting building materials

PAY ATTENTION TO THE MOST VULNERABLE

The study of Local Building Cultures makes it possible to identify the roles and responsibilities, strengths and vulnerabilities of each actor in the family unit and each stratum of society in a given community. The tools developed by the project and refined by the project partners are voluntarily proactive in this desire to take into account gender and specific vulnerabilities in society. Due to the availability of this information, the habitat improvement response of the projects no longer focuses only on strengthening the building but also on improving the living conditions of the inhabitants, with an emphasis on improving existing situations and mitigating inherent vulnerabilities.

RESPOND TO THE REALITIES OF THE POPULATION

Local building practices are constantly evolving. They are often the result of the existing (Local Building Cultures) and of changes in society, in the environment, in the availability of new technologies. All these factors are an opportunity for the inhabitants to improve the existing situation. It is normal to accompany the populations in these changes, but project partners must be careful to promote «ideal» models that would deny the form of relevance of the existing, and which, because of the technical and economic capacities of the local populations, could only be duplicated locally at the price of poor quality products with low resistance to natural hazards, often weaker than local options.

Participatory workshop, Dinajpur

RESULTS

A catalogue of solutions, related to the specificities of the hazards encountered in Bangladesh, classified by different parameters (from its location to its maintenance methods, via its foundation, walls, roof...) and sorted by technical and economic accessibility was produced during the project. It can be a source of inspiration to inform all economic strata of a population of possible solutions for gradual improvements in its constructive practices.

LESSONS LEARNED

Without the implementation of an adapted strategy to let the inhabitant make and assume his own choices, it remains difficult for a project to support the local populations by using all the intelligence they have at their disposal.

Thus, the question of the responsibility of organizations supporting affected people, in relation to the products and services they provide, is an important element to be taken into account in relation to the possibility or not to accompany local populations in the logics of resilience that they already put in place. For example, if the organization offers "turnkey" production of a shelter or house, it makes it virtually responsible for its resistance. It must therefore comply with national and international standards, which in many cases are poorly adapted to the realities of local populations. The products thus provided to the populations are of quality but are also far from the people's capacities and therefore impossible to duplicate, maintain and expand using the technical and financial means locally available. Current thinking in the international community on approaches to giving cash, accompanied by counselling and training, should eventually remedy this situation.

Making the inhabitant responsible for the technical choices that he will implement, while imposing on him the craftsman who must carry out the implementation, gives more flexibility than the previous approach, but again leads to making the project responsible for possible delays, defects resulting from the implementation.

Cash support allows the inhabitants to make the most out of their intelligence. Temporary shelter where no corrugated sheet is pierced, anticipating its future re-use in a permanent house.

Construction of pilot Low Cost Houses (LCH) Project for the Disaster Families of Bangladesh
caritas
Secours Catholique
Réseau mondial Caritas
CRAterre

PROJECT PRODUCTION

CARITAS LUXEMBOURG, SECOURS CATHOLIQUE, CRATERRE, CARITAS BANGLADESH, BUET, 2015. « Construction of pilot Low Cost Houses (LCH) project for the disaster families of Bangladesh » [Online]. Dhaka: Caritas Bangladesh. 178 p. Available at:
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< https://archive.org/details/RebuildingHaiti >

JOFFROY, Thierry (dir), CAUDERAY, Elsa, DEJEANT, Florie, MOLES, Olivier, 2018. « Reconstruction with local architecture: Panay Island, Philippines, 2014-2017. Capitalizing on experiences from two shelter projects in the aftermath of the super typhoon Haiyan. » [Online]. Villefontaine: CRAterre. 40 p. ISBN 979-10-96446-19-3. Available at:
< https://archive.org/details/PanayIsland >

PUBLIC AWARENESS

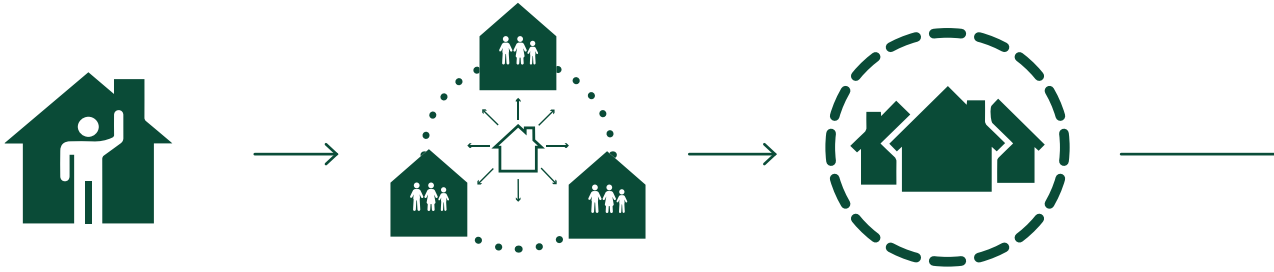
After a disaster, it is common for 80 per cent of the affected population to meet their needs on their own, making the most of their knowledge, observations and what they have been able to learn and understand from the messages conveyed in different ways after the event.

However, the curiosity of the inhabitants to take an interest in what a project is doing for one of the members of this community should not be considered natural. In order to support the entire population in its reconstruction efforts, it is therefore essential to develop strategies that allow indirect beneficiaries to have full access to the knowledge disseminated through the implemented projects. This should enable each inhabitant of the area concerned to make informed choices in the investments they make to rebuild and improve their homes.

These outreach strategies must be proactive. Appropriate means must be secured and projects must develop clear monitoring indicators to achieve this specific target of reaching the neighbours of the beneficiaries.

Within the framework of the project set up by CB, the information collected during the territory diagnoses was very useful for understanding the modes of communication and information dissemination within the local communities. It is on this basis that the project has developed its dissemination and information strategies and activities.

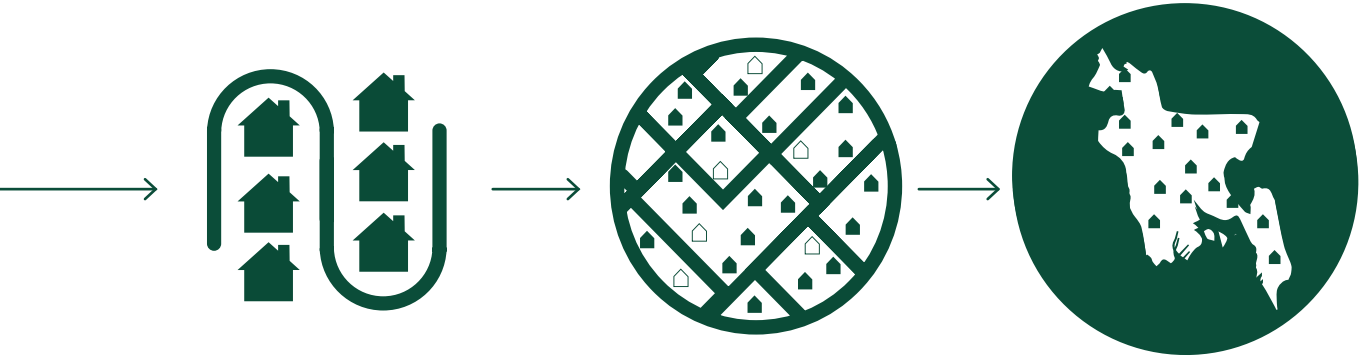
The pedagogical approach developed was to let all actors, teachers and participants, to share their knowledge. The solutions were not stale, but an effort was made to let the public discover the stated principles, reflect on them and understand them for themselves. Organized in plenary sessions, these awareness sessions also allowed the trainers to discover some local knowledge and at the same time allowed each person in the assembly to share and be informed of the knowledge of the other.



Inhabitant Neighbourhood Block

Awareness-raising workshop

Transmission of know-how between members of the community



District

Town

Territory...

RESULTS

Several simple tools for communicating with the inhabitants have been developed and shared within all CB technical teams.

Unfortunately, the time and resources of the project did not allow for the documentation of these tools, nor of the strategic and methodological approaches to the strategies developed. This remains to be done to allow for better sharing.

LESSONS LEARNED

Experience shows that this pooling of individual knowledge often makes it possible to identify the vast majority of good practices and ideas that a project could bring if its objective is to provide answers accessible to the majority of the inhabitants of a given territory.

The sites selected to carry out the training courses must be chosen in such a way as to allow the widest possible dissemination of the knowledge provided by the project. Consideration must be given to ensuring good geographical coverage of the demonstrations carried out. On each site where demonstrations are carried out, the actual location of the demonstration must be chosen in a relevant way (meet a need, but also be accessible, visible, etc...).

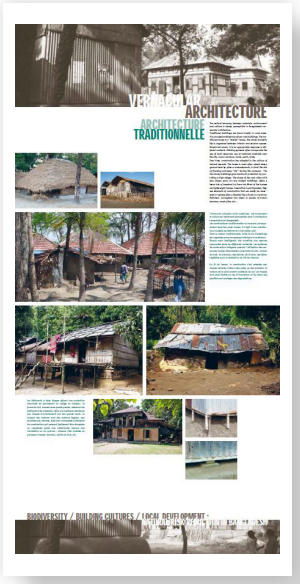
The achievements that serve as training materials must be attractive, even if sometimes they are of a cost level that may be beyond what the poorest populations can actually afford.

All the plenary meetings organized with local communities to share, validate and develop the project's actions are opportunities to initiate the process of building the skills needed to make decisions and mobilize resilience strategies.

Interviews with beneficiaries

Community meeting

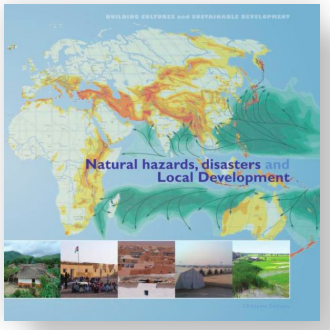
Community mapping



PROJECT PRODUCTION

AMBASSADE DE FRANCE BANGLADESH, INSTITUT FRANÇAIS, ALLIANCE FRANÇAISE DE CHITTAGONG, CRATERRE, BUET, SECOURS CATHOLIQUE, RÉSEAU MONDIAL CARITAS, CARITAS LUXEMBOURG, CARITAS BANGLADESH. « Biodiversité, Cultures Constructives et Développement Local : la réduction des risques naturels au Bangladesh » [Online]. Grenoble: CRAterre. 14 p. Available at: < http://craterre.org/diffusion:expositions/ >

TO FIND OUT MORE



GARNIER, Philippe (dir), MOLES, Olivier (dir), CAIMI, Annalisa, GANDREAU, David, HOFMANN, Milo, 2011. « Natural hazards, disasters and local development » [Online]. Villefontaine: CRAterre. 62 p. Available at: < https://craterre.hypotheses.org/188 >

LOCAL CAPACITY BUILDING

PERPETUATE KNOWLEDGE

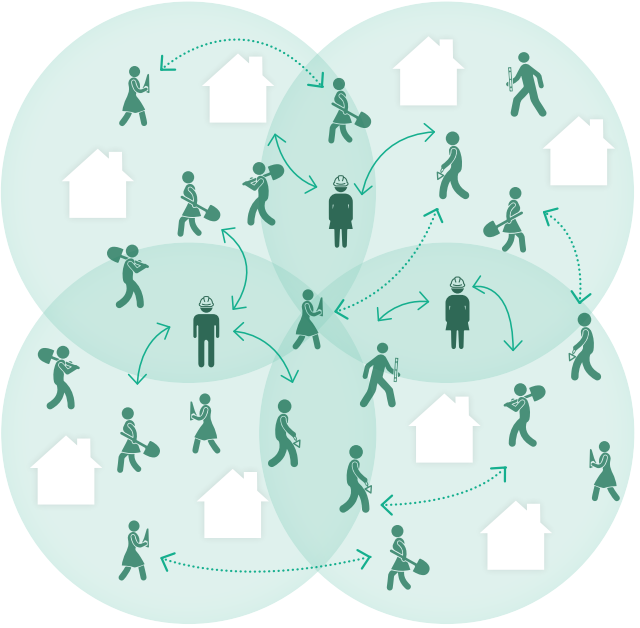
When it comes to disseminating existing good practices or introducing new knowledge within a community, strategies to strengthen the skills of the artisans who will produce or support the production of the project activities, and then of the inhabitants, are needed.

The objective of responding without delay to the quantitative needs generated by a crisis can be complemented by the search for qualitative objectives that will enable local actors to better cope with future crises. In order to achieve these objectives, it is necessary to think about training strategies to reach and involve the different actors involved in the production of housing: material producers and suppliers, craftspeople, technicians, engineers, architects, implementing bodies, specifiers, other partners, etc.

As far as the craftspeople are concerned, the objective will not be limited to reinforcing the technical skills of the learners (the «how to do it») but to give them a good understanding of the function of the different parts of the building and the technical details that make them up (the «why and how it works»). This allows the trainees to imagine new effective solutions for each future context of intervention. For this, it is also essential to help participants understand the various implications (cost, maintenance, time required, etc.).

The postdisaster response does not systematically result in an intervention focused on the construction of a new building. On the contrary, many families who are self-recovering often do so from the housing they had, repairing, strengthening and improving it.

It will therefore be essential in the context of projects to support postdisaster reconstruction not to neglect the component dealing with the diagnosis of the existing house situation and technical solutions to make it usable again, if possible in a more appropriate way.



Transmission of know-how between councillors and craftspeople

Dialogue between councillors and local craftspeople

TRAINING STRATEGIES

Training strategies should be defined according to the absorption capacity of the participants (to be assessed before the start of the training). This logic will also make it possible to plan the stages of project implementation, identifying learners who are rapidly operational and capable of becoming leaders and potential trainers. For the latter, and if this allows the project to better achieve its results, issues relating to site programming and monitoring should be integrated into the training.

Each cycle of comprehension / design / implementation / analysis / sharing between all actors promotes the pooling of skills between local actors (the «learners») and external actors (the «teachers who must also have a learner's posture»). This step is extremely important to refine the initial and technical concept in order to bring them as close as possible to the local reality.

In order to prevent the training provided from ending up with the creation of an elite that, because of the skills acquired, can increase its salary or migrate to other territories, it is important not to concentrate the knowledge provided on a small team. The training strategies should therefore be defined according to the local needs remaining after the end of the project (the objective is that each inhabitant should have access to a person with the technical skills to help him/her carry out the project) and not according to the needs of the project in terms of quantitative results (x houses built in x time).

In order to benefit the local population in the long run, and therefore to ensure that this «new» knowledge can be used after the project ends, it is essential that the trained artisans are those who will remain active in the area concerned. This leads to a recruitment strategy taking into account the local way of producing the habitat (company approach, artisans, self-construction assisted or not, etc.).

The geographical coverage of the people trained by the project must also take into account the usual distances between the location of potential work-sites and the place where the craftspeople

Setting up of reinforced concrete posts by the beneficiaries

Adobe bricks production workshop

concerned live. The initial diagnosis will be a significant source of information that will allow the definition of these strategies.

The construction of a pilot building is a common practice in order to allow the training of craftspeople, the sensitization of a target audience (decision-makers, inhabitants) and the validation of the technical proposal by the beneficiaries. However, it is still important to know that these demonstrations are not a field of experimentation. The development of technical and architectural solutions for the proposed models must be done prior to this training/demonstration stage.

While training through the construction of a demonstration building has many advantages, it is necessary to be aware of some of the limitations of this strategy.

This can take a long time (need to build a house to support the training). This can be costly (the number of learners is limited depending on the size of the building, so the construction of a large number of pilot buildings will be necessary to allow the training of a large number of craftspeople). It will show only a limited number of technical solutions for each part of the buildings, whereas, if the objective is to reach a maximum number of craftspeople (to meet the needs of people in the postproject phases) and a maximum number of audiences (different social strata, different realities within the same

social group), it is necessary to expose the participants to different solutions for the same issues. Thus, training strategies via demonstration houses should be accompanied by more flexible training materials to complement the information provided (possible alternatives to the technical details used on the demonstration house). These complementary approaches must be implemented through pedagogical support that will condense the teaching to be given (small demonstration walls, models, etc.) in order to involve more artisans. This is all the more true when the project aims to transfer knowledge related to the repair and upgrading of existing equipment.

RESULTS

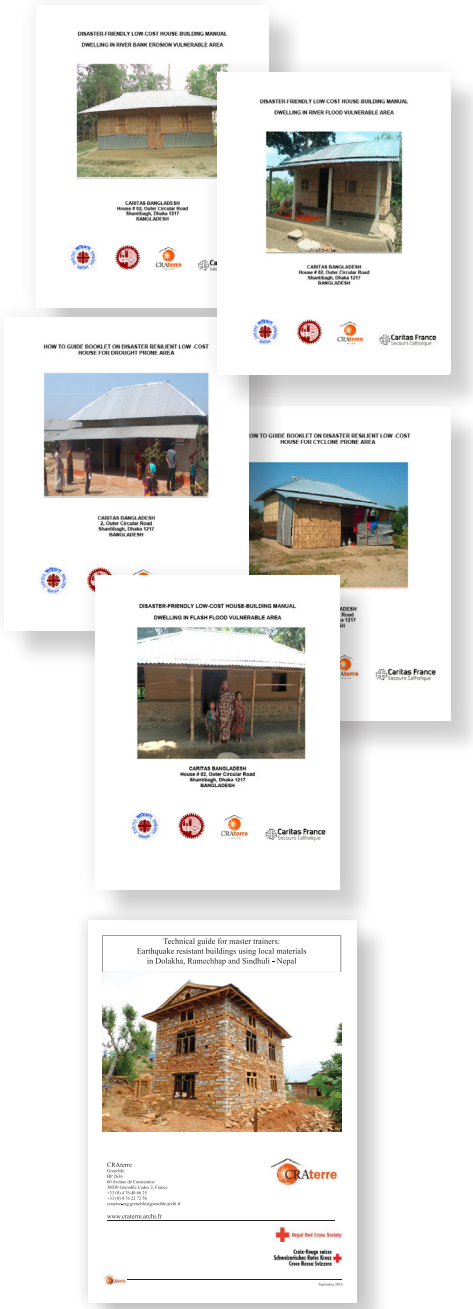
- 155 pilot homes built (110 + 45 homes built under MDFLCH project)
- 21 Training workshops given by CB in strengthening existing knowledge (16 + 5 under MDFLCH project)
- 48 technically improved homes
- 383 artisans trained (258 + 125 trained under MDFLCH project)
- 773 technicians (technical and social) trained within CB teams, national NGOs and local government staff (403 + 370 of training under MDFLCH project)

Stone foundations with mud mortar

LESSONS LEARNED

- If the link between emergency responses, recovery support and development impact is not clearly assumed by the project actors, there is a risk that all the proposed activities will favour the achievement of the project's quantitative objectives, to the detriment of its qualitative objectives, which translates into favouring a «product approach» over a «process approach».
- It is not often that the first solutions developed are the most relevant. The progressive increase in the activities of design, training, demonstration, adjustment, by allowing the maximum horizontal exchanges between learner-trainers and trainers-learners allows for relevant, efficient and frugal solutions that improve the quality of the project in a consequent and surprising way.
- It is important not to freeze the project's contribution to a single construction model or technical detail designed to meet a specific aspect of the construction. Our objective is to help stakeholders understand the overall process of the approach, the architectural choices and the techniques proposed, to have access to a catalogue of solutions that they can use according to their needs and ideally, to be able to invent their own technical solutions in relation to the situations they will encounter.
- Where the project has both new and rehabilitation components, the initial focus is often on the new (easier, more manageable and attractive). Under these conditions, it is often difficult to mobilize local populations and project staff on a repair/rehabilitation approach that requires more finesse (working on a case-by-case basis, obligation to understand the why before the how). It is also more difficult to convince the donor to fund something that is less attractive, less visible. It is well known, however, that when local populations take charge of their own postdisaster recovery, it is repair and reinforcement activities that they favour, for obvious reasons of resources. This must therefore naturally raise questions for the entire international community, governmental and non-governmental actors, about the postdisaster support strategies they favour.
- Where the disaster response strategy includes the production of housing modules, particular attention must be paid to how this initial module will evolve or «risk» evolving. In a product approach, the project will be able to ensure that what is done is consistent with what needs to be done to make the construction safe. But the project will not then be able to intervene on the extensions which will be carried out by the inhabitant and which can annihilate the constructive intelligences of the initial module.

Wood/bamboo frame construction by local craftspeople


DISASTER-FRIENDLY LOW COST HOUSE-BUILDING MANUAL
DWELLING IN RIVER BANK EROSION VULNERABLE AREA
DISASTER-FRIENDLY LOW COST HOUSE BUILDING MANUAL
DWELLING IN RIVER FLOOD VULNERABLE AREA
HOW TO GUIDE BOOKLET ON DISASTER RESILIENT LOW -COST HOUSE FOR DROUGHT PRONE AREA
OW TO GUIDE BOOKLET ON DISASTER RESILIENT LOW -COST HOUSE FOR CYCLONE PRONE AREA
DISASTER-FRIENDLY LOW-COST HOUSE-BUILDING MANUAL
DWELLING IN FLASH FLOOD VULNERABLE AREA
Technical guide for master trainers:
Earthquake resistant buildings using local materials
in Dolakha, Ramechhap and Sindhuli - Nepal

PROJECT PRODUCTION

CARITAS BANGLADESH, BUET, CRATERRE, 2018. « Disaster-friendly low-cost house building manual dwelling in river bank erosion vulnerable area » [Online]. Dhaka: Caritas Bangladesh. 75 p. Available at:
< https://archive.org/details/guide_lch_river_bank_erosion >

CARITAS BANGLADESH, BUET, CRATERRE, 2018. « Disaster-friendly low-cost house building manual dwelling in river flood vulnerable area » [Online]. Dhaka: Caritas Bangladesh. 73 p. Available at:
< https://archive.org/details/guide_lch_river_flood >

CARITAS BANGLADESH, BUET, CRATERRE, 2018. « How to guide booklet on disaster resilient low-cost house for drought prone area » [Online]. Dhaka: Caritas Bangladesh. 79 p. Available at:
< https://archive.org/details/guide_lch_drough_area >

CARITAS BANGLADESH, BUET, CRATERRE, 2018. « How to guide booklet on disaster resilient low-cost house for cyclone prone area » [Online]. Dhaka: Caritas Bangladesh. 74 p. Available at:
< https://archive.org/details/guide_lch_cyclone_area >

CARITAS BANGLADESH, BUET, CRATERRE, 2018. « Disaster-friendly low-cost house building manual dwelling in flash flood vulnerable area » [Online]. Dhaka: Caritas Bangladesh. 79 p. Available at:
< https://archive.org/details/guide_lch_flash_flood_area >

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FERREIRA MENDES, Miguel, HOSTA, Julien, LE GALL, Olivier, 2015. « Technical guide for master trainers: earthquake resistant buildings using local materials in Dolakha, Ramechhap and Sindhuli - Nepal. » [Online]. Grenoble: CRAterre - ENSAG & Croix-Rouge suisse. 116 p. Available at:
< https://archive.org/details/Technical_Guide_Nepal >

SETTING UP FIELD PROJECTS AND ACTORS' CAPACITIES

Exchange on the LCH concept with local craftspeople, BUET and CB

The capacities needed to meet the needs generated by a crisis often exceed the local actors' own capacities, in terms of financial, technical and human resources. Local actors do not always have experience with the tools and methods in use in the world by major disaster response actors. On the other hand, international aid actors do not always have the local relays that enable them to be in tune with the field and therefore have all the finesse and legitimacy that will enable them to intervene effectively and sustainably.

In the event of a major crisis, these two worlds are brought together, to create partnerships. Local actors, often actors in the development aid sector, must be able to adapt to take into account the scale of the needs that must be met as quickly as possible. International actors must be particularly careful not to exceed the capacities of their partners and not to create a situation that could lead their disappearance after the end of the crisis (salaries and logistical means unsuited to the normal context; strengthening the international partner's teams by drawing on the local partner's pool, with great difficulty for the latter to recover these human resources when the international partner leaves the country). It is certainly necessary to think on two levels: knowing how to make the most of local teams to manage part of the needs and knowing how to complement this with «exceptional and punctual» action that will not negatively impact the capacities of local actors.

Within the framework of the CB project, this potential conflict was resolved through CB's capacity to mobilize its teams at the national level to reinforce, if necessary, a regional team that found itself in an extreme situation exceeding its capacities. The choice to intervene on damaged constructions by repairing and reinforcing them or to intervene only on the construction of new shelters is also an extremely complex question. Opting for the new most often satisfies the direct beneficiaries of the project and facilitates the programming of the project which will essentially boil down to a question of logistics once the models to be built have been defined. Opting for a logic of intervention

Community meeting

Field visit

Meeting with community stakeholders

on the existing situation is a little bit of a leap into the unknown; each house, each inhabitant, requires an adapted response. However, when one remembers that 80% of the reconstruction effort is done by the inhabitants themselves and that a tiny percentage of them will opt for a new construction if their old house is still partially standing, it seems crucial to put a very substantial effort into the logic of supporting these dynamics. It is therefore necessary to combine the production of a new habitat (valorizing, serving as an advocacy tool, convincing most of the actors involved) and support for the practices of repairing and improving the existing one (which is done by the majority of the population when they are left to their own devices).

Finally, in many communities around the world, housing production is based on systems of solidarity that unite the population. Territory diagnostics allow us to capture and document this existing situation. It is, of course, extremely important to ensure that the logics put in place by the projects do not run counter to these local practices, which are often fragile, but which are an integral part of local strategies for people's resilience.

Community mapping workshop

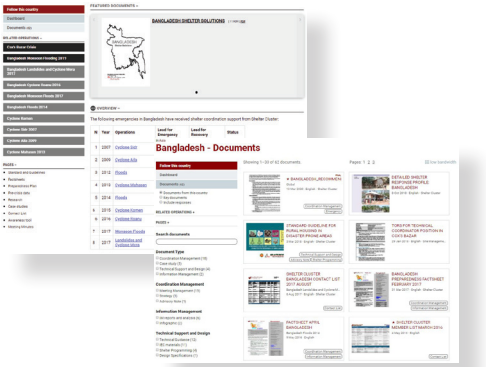
PROJECT PRODUCTION

SHAMSUZZAMAN, M., 2012. « A methodology of coordinated low-cost housing for disaster prone rural areas of Bangladesh » [Online]. Grenoble: CRAterre. 26 p. Available at:
< https://bit.ly/35FvD9x >

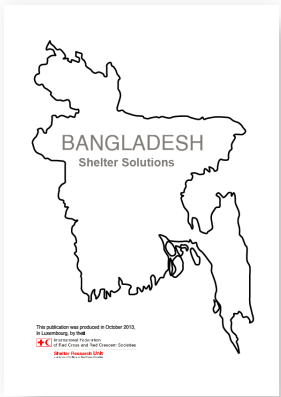
TO FIND OUT MORE

GLOBAL SHELTER CLUSTER. « Emergencies in Bangladesh that have received shelter coordination support from Shelter Cluster » [Online]. (modified on August 6, 2017) Available at: < https://www.sheltercluster.org/asiapacific/bangladesh >

GLOBAL SHELTER CLUSTER. « Bangladesh - Documents » [Online]. (modified on April 30, 2020) Available at:
< https://www.sheltercluster.org/geographic-region/bangladesh/documents >



Improvement of vernacular housing for disaster prone areas in Bangladesh: a six year experience
cases 35 models of disaster
v cost rural homes
Development of Disaster Resilient Affordable House Design for Different Regions of Bangladesh



PROJECT PRODUCTION

MOLES, Olivier, ISLAM, Mohammad Shariful, HOSSAIN, Tahsin Reza, PODDER, Ratan Kumar, 2013. « Improvement of vernacular housing for disaster prone areas in Bangladesh: a six year experience » [Online]. In: Vernacular Heritage and Earthen Architecture. Boca Raton: CRC Press. p. 683-688. ISBN 978-1-138-00083-4. Available at:
< https://hal.archives-ouvertes.fr/hal-00973837 >

ISLAM, Mohammad Shariful, HOSSAIN, Tahsin Reza, MOLES, Olivier, CAIMI, Annalisa, PODDER, Ratan Kumar. Project « Development of Sustainable Low-cost House Design and Construction Method in Different Geographic Regions of Bangladesh » [Online]. (modified on November 5, 2019) Available at:
< https://www.researchgate.net/project/Development-of-Sustainable-Low-cost-House-Design-and-Construction-Method-in-Different-Geographic-Regions-of-Bangladesh >

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IFRC - SRU, 2013. « Bangladesh Shelter Solutions » [Online]. Bertrange: The International Federation of Red Cross and Red Crescent Societies - Shelter Research Unit. 47 p. Available at:
< https://www.sheltercluster.org/bangladesh/documents/bangladesh-shelter-solutions >

BENEFICIARY SELECTION

STEP 1: ORGANIZE AND FACILITATE A FIRST COMMUNITY MEETING TO LAY THE FOUNDATIONS OF COMMON UNDERSTANDING FOR THE WHOLE PROCESS

Method:

- Discuss with local officials to decide the date, time and location of an initial meeting;
- Communicate from house to house, use loudspeakers and follow up on community participation in the meeting ;
- Organize community meetings (one per village / group of villages): Share the objective of the meeting / Ask for suggestions of criteria for the selection of beneficiaries / Present the usual criteria recognized by the international community / Highlight the common points (usual criteria within the humanitarian community and unusual or specific to the local community) / Ask for validation or invalidation of the different criteria identified;
- Re-discuss the selection criteria and reach a consensus decision on those selected.
- Select a first list of beneficiaries in accordance with the agreed criteria
- Validate each name in plenary;
- Prepare a list of priority beneficiaries;
- Discuss the process of finalizing the list of beneficiaries. Where to display the first list of beneficiaries? If necessary, plan a reading (when, by whom, where) of this list so that it is known to the entire population. How to collect the comments and suggestions of the population? What are the procedures for collecting grievances (written or oral)?

Objectively verifiable indicators:

- Participation of 70% to 80% of all the communities concerned in the meetings.
- Preparation of the initial priority list of beneficiaries according to the co-defined criteria.

Meeting to explain the selection criteria for beneficiaries, Puthia

Meeting with the local community, Porsha

STEP 2: COMMENTS ON THE PROVISIONAL LIST OF BENEFICIARIES

Method:

- Implementation of Step 1 activities regarding the posting and collection of grievances regarding the first list of beneficiaries ;
- Record verbal and written complaints and comments.

Objectively verifiable indicators:

Effective registration of Community grievances on the initial priority list of beneficiaries.

STEP 3: FINALIZATION OF THE LIST OF BENEFICIARIES

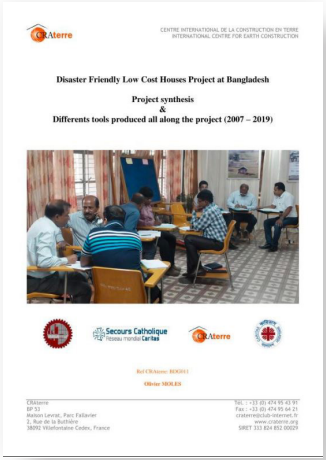
Method:

- Review complaints with the project committee and the CB representative;
- Verify/investigate positive or negative comments (field visits) ;
- Check the initial priority list with government and other NGOs to avoid duplication;
- Communicate the results of the grievance review to the community at large ;
- Changing beneficiaries in the event of a valid complaint ;
- Prepare the final list of beneficiaries ;
- Validate the final list with the local authorities.

Objectively verifiable indicators:

- The list of beneficiaries has been finalized.

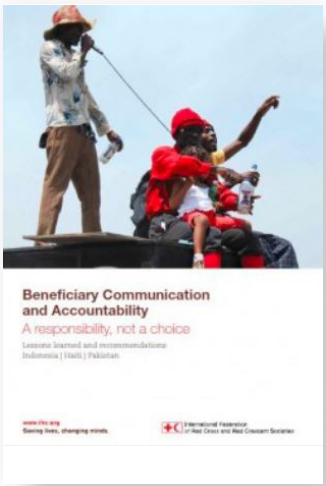
Beneficiary selection, Rajshahi



PROJECT PRODUCTION

MOLES, Olivier, 2020. « Disaster Friendly Low Cost Houses Project at Bangladesh: Project synthesis & Differents tools produced all along the project (2007 – 2019) » [Online]. Villefontaine: CRAterre. 101 p. Available at: < https://archive.org/details/project-synthesis-lch-bangladesh >

TO FIND OUT MORE



IFRC, 2011. « Beneficiary Communication and Accountability. A Responsibility, Not a Choice: Lessons Learned and Recommendations » [Online]. Geneva: International Federation of Red Cross and Red Crescent Societies. 68 p. Available at: <https://www.alnap.org/help-library/beneficiary-communication-and-accountability-a-responsibility-not-a-choice-lessons >

This document outlines lessons learned from recent beneficiary communication and accountability (BCA) programmes in Indonesia, Haiti and Pakistan and provides recommendations and emerging guidelines on how to incorporate BCA into emergency response, recovery and development work.

SCALING UP

LINKING FIELD ACTIONS, RESEARCH AND EDUCATION

Involving BUET University in the whole process from the beginning of the project has enabled the teacher-researchers involved to capitalise on the knowledge and methods acquired through the production of scientific articles and through participation in conferences and seminars related to the issue at hand.

COMMUNICATE WIDELY ABOUT PROJECT RESULTS

The tools and products produced during or in parallel to the project were widely shared in Bangladesh and elsewhere through project initiatives (conferences, exhibitions, working groups), through the networks of each partner, and in particular through the Caritas network (Caritas internationalis), the shelter working group network in Bangladesh and the coordination of these working groups in Geneva.

INTEGRATE AND GET INVOLVED IN THE NETWORK OF ACTORS INVOLVED IN THE THEME

CB has been actively involved in the activities of the Shelter Cluster in Bangladesh and in all the activities carried out by this working group in order to evolve at the national level the approaches of response to and prevention of disaster in terms of habitat.

Seminar On
Sustainable Architecture in Bengal
Chief Guest : Prof. Anwarul Azim Arif,
Special Guest : Mr. Arnaoud Loizeau,
Presided by : Engr. Mohammad Harun,
4th December 2012
Seminar on Sustainable Architecture in Bengal at the The Institution of Engineers Bangladesh

RESULTS

- Since 2012, courses, even if they are not yet compulsory, have been offered within BUET and to postgraduate and higher education students. Master and postmaster students were involved in the implementation of different activities related to the needs of the field. This suggests that, in the near future, more and more Bangladeshi managers will have had access to this approach of taking into account local building intelligences and will thus be able to understand, implement and promote these approaches in their working lives at the level of decision-making that will be theirs.
- The project partners have seized and provoked opportunities, whenever possible, to communicate, raise awareness and disseminate the lessons learnt during the process put in place. Conferences have been organized, promotional tools (exhibitions in France and

Training of Trainer (ToT) for construction of
Disaster Friendly Low cost House
Date: 04-06 March 2017
Venue: Caritas Mymensingh Regional Conference Hall
Organized By:
Caritas Bangladesh

Training of trainers for the construction of LCH disaster-safe houses

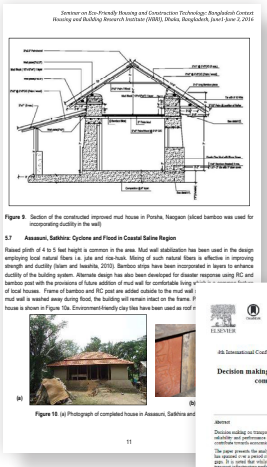
Technical Assessment

Bangladesh) and information on the project have been produced (this brochure is part of this dynamic). Posters and scientific articles have been produced and published.

- The experience acquired by CB during this project has given it the recognition and skills necessary to occupy the position of co-coordinator of the shelter response to the crisis of the Rohingya refugee populations in Cox's Bazaar (since 2018). The approach developed has thus been implemented in the reflection that accompanies the response to this crisis.

LESSONS LEARNED

- Envisaging a change of scale, or in our case, how local action can influence national responses to postdisaster situations, implies a long time and the involvement, from the start of the project, of multidisciplinary teams, each of which can act at its own level and with its own network of influence. This project has been fortunate to be able to count on a commitment of more than ten years from the emergency department of Secours Catholique - Caritas France. It is quite rare for organizations with an emergency mandate to commit to supporting action research actions in the field. It is therefore important to note that, in addition to interesting field results with disaster victims, this support has made it possible to improve the tools and methods of each of the project partners and, moreover, has had a major impact on the way of thinking about postdisaster response in Bangladesh and elsewhere in the world.



Seminar on Eco-Friendly Housing and Construction Technology: Bangladesh Context
Housing and Building Research Institute (HBRI), Dhaka, Bangladesh, June1-June 3, 2016

Figure 9. Section of the constructed improved mud house in Porsha, Naogaon (sliced bamboo was used for incorporating ductility in the wall)

5.7 Assasuni, Satkhira: Cyclone and Flood in Coastal Saline Region

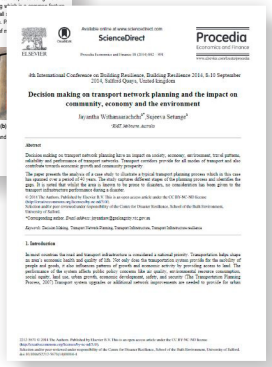
Raised plinth of 4 to 5 feet height is common in the area. Mud wall stabilization has been used in the design employing local natural fibers i.e. jute and rice-husk. Mixing of such natural fibers is effective in improving strength and ductility (Islam and Iwashita, 2010). Bamboo strips have been incorporated in layers to enhance ductility of the building system. Alternate design has also been developed for disaster response using RC and bamboo post with the provisions of future addition of mud wall for comfortable living [illegible] of local houses. Frame of bamboo and RC post are added outside to the mud wall [illegible] mud wall is washed away during flood, the building will remain intact on the frame. [illegible] house is shown in Figure 10a. Environment-friendly clay tiles have been used as roof [illegible]

(a)

(b)

Figure 10. (a) Photograph of completed house in Assasuni, Satkhira and

11



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Decision making on transport network planning and the impact on community, economy and the environment

Jayantha Withanaarachchi*, Sujeeva Setunge*
*Add Affiliation Across

Abstract

Decision making on transport network planning have an impact on society, economy, environment, travel patterns, etc. Transport network planning is a complex process. Corridors provide for all modes of transport and also contribute towards economic growth and community prosperity.

The paper presents the analysis of a case study to illustrate a typical transport planning process which in this case has spanned over a period of 42 years. The study captures different stages of the planning process and identifies the gaps. It is noted that whilst the area is known to be prone to disasters, no consideration has been given to the transport infrastructure performance during a disaster.

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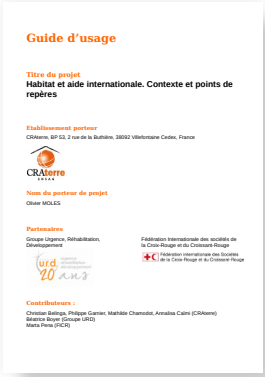
*Corresponding author. Email address: jayantaw@postgrads.ntu.gov.au

Keywords: Decision Making; Transport Network Planning; Transport Infrastructure; Transport Infrastructure resilience

1. Introduction

In most countries the road and transport infrastructure is considered a national priority. Transportation helps shape up the economy of a country. Efficient transport helps in the movement of goods, services and people. It helps in the growth of goods, it also influences patterns of growth and investment activity by providing access to land. The performance of the system affects public policy concerns like air quality, environmental resource consumption, social equity, land use, urban growth, economic development, safety, and security (The Transportation Planning Process, 2007) Transport system upgrades or additional network improvements are needed to provide for urban



Guide d'usage

Titre du projet
Habitat et aide internationale. Contexte et points de repères

Etablissement porteur
CRAterre, BP 53, 2 rue de la Buthière, 38092 Villefontaine Cedex, France

CRAterre

Nom du porteur de projet
Olivier MOLES

Partenaires
Groupe Urgence, Réhabilitation, Développement

urd 20 ans

Fédération Internationale des sociétés de la Croix-Rouge et du Croissant-Rouge

Fédération internationale des Sociétés de la Croix-Rouge et du Croissant-Rouge

Contributeurs :
Christian Bellinga, Philippe Garnier, Mathilde Chamodot, Annalisa Caimi (CRAterre)
Béatrice Boyer (Groupe URD)
Marta Pena (FICR)

PROJECT PRODUCTION

ISLAM, Mohammad Shariful, HOSSAIN, Tahsin Reza, PODDER, Ratan Kumar, MOLES, Olivier, 2016. « Environment-friendly Sustainable Rural House Designs for Different Geographic Regions of Bangladesh » [Online]. In: Seminar on Eco-Friendly Housing and Construction Technology: Bangladesh Context, 1-3 June, 2016. Dhaka: Housing and Building Research Institute (HBRI), 14 p. Available at:
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< https://www.sciencedirect.com/science/article/pii/S221256711401020X?via%3Dihub. >

TO FIND OUT MORE

Online course to understand the challenges of humanitarian intervention concerning housing, allowing to acquire basic concepts.

MOLES, Olivier, BELINGA NKO'O, Christian. « Habitat et aide internationale. Contexte et points de repères » [Online]. Villefontaine: CRAterre. 38 p. Available at:
< https://ressources.fondation-uved.fr/Cours_CRAterre/ >

EXIT STRATEGY; ensuring the sustainability of the processes undertaken

The participatory approach, the training of teams in each region and the development of several guides have enabled the partners to take ownership of all the approaches and tools proposed by the project.

At the local level, this approach has made it possible to provide local populations with responses adapted to their capacities, desires, culture, etc., thus making it easy for the community itself to duplicate them. The strategies of training local craftspeople on knowledge and solutions in line with the reality of the local market means that they apply these solutions in their daily professional lives and thus transfer them to their apprentices.

Shelter Task Forces are created in the intervention communities. They play a very important role in the dissemination and replication of the work methodology for the construction of LCH.

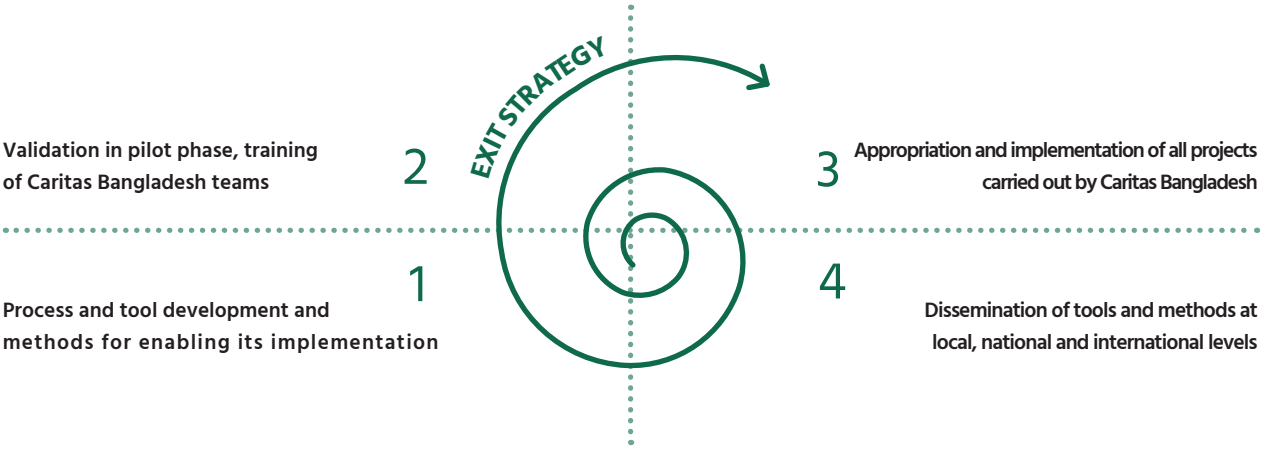
RESULTS

CB is now autonomous for the integration of this working methodology in their project related to habitat and disaster risk reduction and applies this project approach for any new activity in the field.

BUET, involved since the beginning of the project, has mastered the whole process and has developed some of the concepts and methods that are now an integral part of the process. It is therefore natural that they apply it independently in their projects and teach it in their university curriculum and motivate their students to conduct further research on affordable housing in Bangladesh.

LESSONS LEARNED

It is imperative to size the project in relation to the capacities of the local actors, in order to avoid creating an artificial dynamic (profusion of means) within the partner teams, a situation that will then be difficult


EXIT STRATEGY
2
Validation in pilot phase, training of Caritas Bangladesh teams
3
Appropriation and implementation of all projects carried out by Caritas Bangladesh
1
Process and tool development and methods for enabling its implementation
4
Dissemination of tools and methods at local, national and international levels

to maintain in the normal operating conditions of the local structures. The “do not harm” must also apply to operational partners in the field.
The “turnover” of senior and middle management within the various project partners, whether at the level of implementing partners or donors, must be anticipated and managed.

It takes time for the new people involved to integrate the existing and develop a shared vision of the future, bringing their own contribution to it.

A strategy for capitalizing on the project’s achievements would certainly have facilitated the dynamics of the project at certain points in its life. At the same time, the implementation of the project, based on a succession of field operations of a fairly limited scale, does not make it easy to provide ad hoc budgets so that this capitalisation effort can be anticipated and implemented under good conditions throughout the project. Even if this is regrettable in hindsight, these capitalisation strategies are sometimes difficult to anticipate at the time of project development. It would be good, however, if this were done systematically, at least in a long-term logic for the partners in the field.

Houses in Ashashuni, Khulna

This programme has enabled the various partners, particularly Caritas Bangladesh, to gain recognition by the Government of Bangladesh and the national and international community of emergency shelter response actors. This shows that this type of approach and the results that it allows are in line with the expectations of the sector at the level of the countries concerned. Today, the experience gained from this project gives Caritas Bangladesh the legitimacy to inform, raise awareness and advocate with the international community.

At the different levels of partnership of the project, we see a strong ownership of the process and a capacity of each one to continue at his level to carry it forward. This result is linked, in our opinion, to the effort made at each stage to co-construct the project, its activities, strategies and solutions. Local actors, and in particular local communities, are particularly attentive to make the link between emergency, rehabilitation and development, obviously in the long term. The approach proposed by the project helps them to better project themselves into the future and therefore contributes to the relevance of the choices made.

If, faced with the urgency of the needs, the time taken to understand the territories and to allow the populations to participate in the whole project process seems to be a waste of time, it allows a quantitative and qualitative gain on the response provided. It also helps to strengthen the social cohesion of the communities involved by making them responsible for the choices that are made. Similarly, it makes people proud of their cultures and skills by recognizing their true value and valuing them in the solutions conveyed by the project.

This time also allows the actors to get to know each other better and to know how to accompany the reconstruction at the speed of people. This makes it possible to pool the knowledge of

Decision-making meeting with the local community

Stabilization of the roof by creeping plants

local and external expertise, to pool knowledge within communities and to combine knowledge from tradition and modernity. It also enriches the knowledge of external experts who are thus more likely to share it with other communities. In the end, it also saves time on the implementation of the project, as it avoids groping around and going backwards in relation to a match from the outset between the solutions developed and the effective capacities of the inhabitants and the resources and constraints of the territories where they live.

The effort to capitalize on all stages of the project, through the production of documents/design manuals/training guides, is essential in order to be able to draw lessons from each experience and to disseminate them widely to improve disaster response and prevention.

However, it remains clear that the type of housing produced as a training aid and made available to the most disadvantaged, even if they are very economical constructions, often remain at a cost that exceeds the capacity of the vast majority of local populations. It is therefore important that the different solutions proposed via the demonstration buildings can be understood and prioritized, so that in their reconstruction process, the inhabitants can make informed choices as to what they will prioritize in relation to their priorities and resources.

Field visit with craftspeople and beneficiaries

All the project partners are unanimous in recognizing that the main reason for the success of the project lies in the learning position of each of the actors. If, at the beginning of the process, everyone wanted to bring the best of themselves to meet the challenges encountered, it soon became clear that this could only be achieved on condition that the relevance of the knowledge (technical, social, management, etc.) of the other partners and that of the local communities first and foremost be recognised.

The most important recommendation that we can make in the light of this experience is that everyone should be able to keep this posture, to get out of an arbitrary position between «knowing externally» and «learning locally», to allow ourselves the right to astonish, to marvel at the knowledge of others.

Beyond the promotion of improved housing, it is important to help local communities to become aware of how these improvements, and possibly the investments they require, will impact on a sustainable improvement in their living conditions. Without this, some people will not be willing to make the effort to implement the project's recommendations.

Our strength has been our iterative approach, our ability to ask ourselves the question of readjustments and the reorientation of our actions by establishing an ongoing dialogue with all the players involved. We can only recommend a systematic application of this approach by adopting a horizontal decision-making stance involving local communities, for all projects interested in improving the living conditions of given populations in a given territory.

Another confirmation of this experience is in the fact that the time of the project is rarely in phase with the time needed for local populations to appropriate new practices, to make their practices evolve. Our dilemma is to achieve concrete results within the time frame

Representatives from Caritas Bangladesh, Caritas France and CRAterre

of the project (product approach) while at the same time creating the necessary environment to enable positive change in local practices (process approach). Our main recommendation for reconciling these two temporalities is to think about exit strategies from the very first moments of the project. Imagine what would be the ideal situation at the end of the project to ensure the sustainability of the processes undertaken. Thinking beyond a purely quantitative answer, asking how these results will be able to benefit a wider population than the restricted circle of its direct beneficiaries, while remaining humble in relation to the means and time available. It seems to us that this positioning is a key that allows a real change in society through a one-off disaster response initiative. It also seems relevant to us to recommend a consequent increase in the number of researches and analysis of local constructive knowledge, in order to better master the intelligences and to make them evolve positively if necessary.

These studies could eventually lead to an evolution of construction standards in Bangladesh, to make the best use of relevant existing knowledge.

In the same vein, the richness of this project has been to widely involve all the actors involved in the production of postdisaster housing in Bangladesh.

Three-step plinth, Sirajdikhan

Inhabitants, local actors in disaster response, those involved in supporting the population in risk reduction, disaster preparedness and local development of these same populations. But also actors (government, administrations, university, local NGOs) who were able to give legitimacy to the proposals made by the project and who weigh in the development of competences and sensitivities towards the knowledge and political/normative decisions in the country.

In order to promote a sustainable impact and a change of scale it is crucial to encourage, from the very first moments of the projects and as far as possible, the involvement of this diversity of actors during the implementation of any disaster response project. It is important that the action initiated by the local partners can thus be continued in the daily life of the local actors involved, in their teaching, research, normative and administrative framework implementation, and in their support for the development dynamics of local populations. In the same vein, it seems particularly important to continue research in the field of low-cost housing in Bangladesh and to include this type of programme in the training curricula of the country's technical schools and universities.

The documents produced during the project are aimed at different audiences, different types of partners. These documents are necessary to capitalize on the project's achievements and share them beyond the project partners. It is important to be able to tailor these messages to the targeted audiences.

Our recommendation is to plan these capitalizations, aimed at different audiences, from the early stages of the project. We did not do this on this project and the effort made in hindsight to achieve the current result was particularly heavy in terms of mobilization. Focussing on a capitalization perspective from the start of this program would have allowed us to set up a dynamic that would have enriched all stages of the project.

One observation of the project is that, despite the efforts made to offer economic housing to local populations, the proposed new housing models, although respecting the level of costs defined by the Government of Bangladesh for this type of project, often remain too high to hope for identical appropriation by the most vulnerable groups. On the other hand, we have also seen that reconstruction, when it is carried out by local people, never starts from scratch. People are repairing their houses, reinforcing them, salvaging materials from the debris of their previous homes. In the context of new demonstration housing, it is therefore necessary to show not only good construction practices, but also recovery solutions. This allows the populations to prioritize their choices in line with their dreams and means, as well as to adapt the constructive principles promoted to the means, equipment and materials at their disposal. It also seems relevant to us to recommend that the choice to show good practices in housing improvement should not only be made through the construction of new buildings, but also through demonstration, repair and reinforcement of existing ones; an exercise that is less easy to set up in the framework of an emergency response project, but more in line with the reality of people in their own postdisaster recovery efforts.

It is also important not to take a romantic view of local knowledge. Changing cultural, socio-economic and environmental contexts must be taken into account. When designing rural house models in each region, special attention must be paid to the environment and sustainability issues by using locally available materials in a rational, thoughtful and anticipated manner.

Credits

Under the direction of
Olivier Moles

Authors
CRAterre: Christian Belinga Nko'O, Elsa Cauderay, Julien Hosta, Olivier Moles, Bakonirina Rakotomamonjy, Nuria Sanchez Munoz, Enrique Sevillano Gutiérrez
BUET: Prof. Dr. Mohammad Shariful Islam & Prof. Dr. Tahsin Reza Hossain
Caritas Bangladesh: Mr. Ratan Kumar Podder

Contributors
Lara Briz, Annalisa Caimi, Eugénie Crété, Florie Dejeant, Jonas Ducret, Héctor Esteban, Miguel Ferreira Mendes, Carolyn Garcia, Philippe Garnier, Majid Hajmirbaba, Pablo Haro Pérez, Mikel Larraza Álvarez, Sébastien Moriset, Amar Sharma, Vincent Trabaud, Alexander Tripura, Corine Van Reeuwijk, Pintu William Gomes

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Annalisa Caimi, Olivier Moles, Ratan Kumar Podder, Prof. Dr. Mohammad Shariful Islam, Prof. Dr. Tahsin Reza Hossain

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Dr. Md. Zoynul Abedin, Dr. Ahsanul Kabir, MD Shah Alam, Ruhul Amin, Dr. A.B.M Badruzzaman, Engr. Arifuzzaman, Engr. Shamima Narsirn Sathi, Engr. Farnia Nayar Parshi, Md. Murshed Alam, Abu Sayed Rashed, Denis C. Baskey, Selina Begum, Samuel Berthet, Michael Biswas, Patrick Branco, Annalisa Caimi, Audrey Carbonnelle, Charley Causeret, Paritosh Chakrabarty, Christèle Chauvin, Nirunkush Chiran, Delphine Cornet, Laure Cornet, James Costa, Jatin Cruze, Sébastien Dechamps, Romain Devries Augustine D'Cruze, Fanny Delgute, Amal Kumar Dhar, Akhila D'Rozario, Doctor Benedict Alo D'Rozario, Shiba Mary D'Rozario, Moni D' Rozario, Ujjal Ekka, Annesha Enam, Charles de Foucaucourt, James Gomes, Litan Gomes, Prodip Stanley Gomes, Danial Sipu Gomes, John Swapan Gomes, Marcel Ratan Guda, Tomas Hambrom, Chanda Hawaii, Nazmul Hossen, AJM Mazharul Islam, Faridul Islam, Fanny Jamet, Abdul Khaleque, S.M. Kowsar, Delphine Lapenu, Olivier Litvine, Arnaud Loizeau, Carole Lory, Yoann Maldonado, Uttam Mandol, Ashim Mankin, Bhuton Marandy, Shishir Mree, Apurbo Mrong, Jatin Murmu, Shamina Nasrin, Albino Nath, Bregje Nouwens, Céline Pinson, Hubert Sony Ratna, MD Mostafizur Rahman, Swapan Rozario, Hugues Rostaing, Golan Rosul, Khalid Md. Saifullah, Abdus Salam, M. Shamsuzzaman, Robert Ruben Sarker, Tapash Sarker, Uzzal Kumar Sen, A. B Siddique, Dhritu Snal, Adu Taher, Arook Tappa, Marina Trappeniers, Francis Bepari, Jugen Julian Besra, Theophil Nokrek, Ranjon Francis Rozario, Francis Atul sarker, Sebastian Rozario, Denis Baske, Agustine Cruze, John Montu Palma, Francis Bepari

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CARITAS BANGLADESH
2 Outer Circular Road, Dhaka 1217, Bangladesh
+880 2-8315405
cbgeneral@caritasbd.org ; info@caritasbd.org ;
http://www.caritasbd.org

CARITAS LUXEMBOURG
International Cooperation
29, rue Michel Welter,
L-2730 Luxembourg
+352 40 21 31 511
http://www.caritas.lu

SECOURS CATHOLIQUE - CARITAS FRANCE
Pablo Haro Pérez, Asia Project Officer Emergency Department
106 Rue du Bac, 75341-Paris, France
+33(0)145497370
dept.urgencesinternationales@secours-catholique.org ;
http://www.secours-catholique.org

CRATERRE
ENSAG, 60 avenue de Constantine 38036-Grenoble, France
+33(0)476698335
craterre@grenoble.archi.fr ;
http://www.craterre.org/

BUET
Department of Civil Engineering
Bangladesh University of Engineering and Technology (BUET)
Zahir Raihan Road, Dhaka 1000, Bangladesh
+880-2-55167100, +880-2-55167228-57
http://www.buet.ac.bd

CONTACTS

Acronyms

BUET	Bangladesh University of Engineering and Technology
CARIux	Caritas Luxembourg
CB	Caritas Bangladesh
CEA	Community Engagement and Accountability
CRAterre	International centre for earthen architecture
CUET	Chittagong University of Engineering and Technology
FEM	Structure calculation: / Finite element method
HBRI	Housing and Building Research Institute
IFRC	International Federation of Red Cross
IOM	International Organization for Migration
LBC	Local Building Cultures
LCH	Low Cost Housing
MDFLCH	Mainstreaming Disaster Friendly Low Cost House
NGO	Non-Governmental Organization
PASSA	Participatory Approach to Safe Shelter Awareness
SC-CF	Secours Catholique – Caritas France
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
VCA	Vulnerability and Capacity Assessment

Past experiences on postdisaster response have highlighted the need for more context-specific approaches that not only produce an effective and efficient resettlement response, but also contribute directly to a sustainable and long-term reduction of local vulnerabilities.
Based on the lessons learned from the postdisaster response in Bangladesh following the cyclones of 2007 and 2009, Caritas Bangladesh, with the support of BUET and CRAterre and the support of Secours Catholique-Caritas France and Caritas Luxembourg, took up the challenge of involving local communities, operational stakeholders and academics to foster a response linking emergency, rehabilitation and development.

It is the synthesis of this history, as well as links to all the tools and methods developed by this project between 2007 and 2019, which you can access by leafing through the book, which is in your hands.

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